The Adverse Effects of Fossil-Fuel Subsidies in Indonesia

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May 2014

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2014

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Trykk: Reprosentralen, Universitetet i Oslo

Acknowledgements

I am deeply grateful to my supervisor Karen Helene Ulltveit-Moe for her guidance and encouragement throughout the writing process. Her invaluable inputs and instructions contributed significantly to my progression.

I would also like to thank my brother Kristian for helpful feedback and discussions. His care and support greatly facilitated my stay in Jakarta during the summer of 2013 working at Norwegian company Q-Free, which inspired me to write about this fascinating topic.

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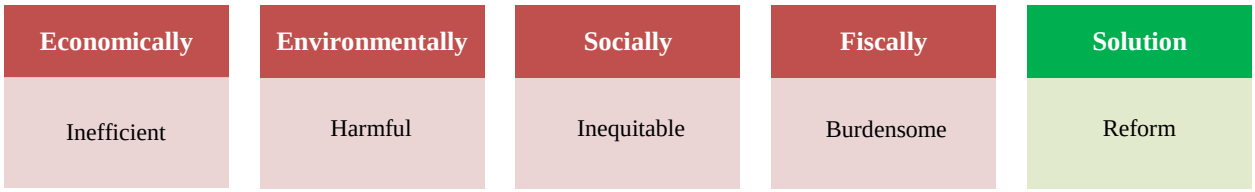
1. Introduction

Subsidizing consumers of petroleum products is a common phenomenon in many developing and emerging economies. The rationale differs, but in most cases the intention is to shield low-income households. Meanwhile, in contrast to its intensions, there is growing evidence that fossil-fuel subsidies fail to protect the poor. Typically, they are found to be ineffective in meeting social objectives and inequitable in that they only benefit high-income households. In addition, fuel subsidization often constitutes a large budgetary burden on government accounts, which in turn implies that resources are diverted away from potential pro-poor programs. Thus, it seems as if fuel subsidies not only fail to protect the poor, but even punish them. Figure 1.1 sums up the adverse effects of fossil-fuel subsidies that will be investigated in this paper.

Figure 1.1: The Adverse Effects of Fossil-Fuel Subsidies



The above arguments will be examined through a country-specific analysis. Indonesia represents one of the world's fastest growing economies (5-6% growth annually in recent years), but fuel subsidization remain one of the key challenges for the country to unleash its true economic potential. Fossil-fuel subsidies were introduced in Indonesia to make available a "basic need" for the poor, but the policy has become increasingly unsustainable ever since the country became a net oil importer. However, it should be stressed that the adverse effects of fossil-fuel subsidies apply regardless of whether the country is a net oil importer or net oil exporter. Thus, in broader terms, the case of Indonesia is implicitly used to highlight the global problem of petroleum product subsidization. The issue is especially intriguing because most Western countries practice the exact opposite, i.e. taxation of fossil-fuel consumption.

First and foremost, this paper provides an empirical review based on existing research related to the adverse effects of fossil-fuel subsidies. Using the theory of welfare economics, this

thesis sheds light on how subsidization of fossil fuels leads to wasteful consumption. In turn, this entails a range of negative consequences for the entire economy, and other methods will be applied to demonstrate these. For instance, Indonesian national accounts will be analyzed when examining the fiscal impacts. As another example, surveys of household expenditure data will be examined to determine which part of the population that benefits the most from fossil-fuel subsidization. Focus will be on the subsidies of gasoline, diesel and kerosene as these constitute the most heavily subsidized by-products of fossil fuels in Indonesia. For simplicity, these three products will be frequently referred to as just "fossil fuels" or "petroleum products" henceforth, even though these are generic terms which normally include oil, gas, coal and electricity.

The remainder of this section provides a brief introduction of fossil-fuel subsidies and explains their prevalence in developing countries. Section 2 presents characteristics of the Indonesian subsidy scheme while section 3 explores the impacts of petroleum product subsidization. Section 4 highlights the opportunity cost of subsidizing fossil fuels by focusing on two development programs in the areas of health and education yet to be realized. Section 5 draws attention towards the Indonesian cash transfer program as an alternative to subsidization and discusses different approaches to phasing out fossil-fuel subsidies.

1.1 What is a Fossil-Fuel Subsidy?

In economics, a subsidy is usually defined as a payment that reduces the amount that buyers pay for a good, or increases the amount that sellers receive. Finding a commonly agreed definition of fossil-fuel subsidies however, is not necessarily as straightforward. Still, the International Energy Administration defines energy subsidies as "any government action that lowers the cost of energy production, raises the revenues of energy producers, or reduces the price paid by energy consumers" (IEA et al. 2010, p.5)[1].

A lot of countries have even adopted their own definitions given the plentiful interpretations. The government of Indonesia defines fuel subsidies as "budgetary allocations given to a company or institution that produces or sells fuel with the purpose of providing access to

[1] The IEA use the terms "energy subsidies" and "fossil-fuel subsidies" interchangeably.

energy at an affordable price, or keeping fuel prices lower than market prices by applying an administered price policy" (GSI-UNEP 2010, p.34).

Whatever the definition, broad or narrow, it is useful to distinguish between two types of fossil-fuel subsidies – those designed to reduce the cost of consuming, and those aimed at supporting domestic production (Ellis 2010, p.10). While consumer subsidies are generally intended to stimulate certain sectors of the economy or to alleviate poverty, producer subsidies are often used to keep marginal producers in business. Also, while consumer subsidies are more common in developing countries, usually in form of price controls, producer subsidies are more frequent in developed countries (Ellis 2010, p.11).

1.2 Why Subsidize Fossil Fuels?

To explain why some countries like Indonesia choose to subsidize energy products, it is necessary to understand the role of energy as a commodity and its function for low-income households in developing countries. The United Nations Environment Programme (UNEP) defines the role of energy as essential to all economic activities and to human well-being (2008, p.5). Specifically, access to modern energy services contribute to a higher standard of living by improving the availability of basic human needs such as the production of food, the provision of shelter, and access to health services. Therefore, making energy access reliable and affordable for the poor also serves as a rationale for subsidizing fossil fuels.

Generally the idea is that the society as a whole would benefit if everyone had access to modern energy services, but that the existing market does not reflect that "social good" (UNEP 2008, p.20). By intervening in the market through subsidies, governments can reduce the initial cost of energy. This is particularly favorable for low-income households who normally devote a large fraction of their incomes on energy (World Bank 2010, p.47). Thus, fossil-fuel subsidies enable these households to become energy consumers. The problem is that while such subsidies can be beneficial, they can also be harmful, inefficient, and in some cases detrimental to the poor.

1.3 Petroleum Product Subsidies around the World

The International Energy Agency's latest estimates indicated that fossil-fuel subsidies amounted to USD 544 billion worldwide in 2012. This was more than five times higher than global renewable subsidies (IEA, Energy Subsidies). Some countries have contributed more to this figure than others, for instance Saudi-Arabia. The Saudi kingdom enjoys sky-high petroleum revenues from its oil exports and has become one of the largest subsidizing countries in the world (IEA, Subsidy Index 2012). Still, the extensive practice of lowering fuel prices has increased domestic consumption to an alarming level. A recent study warns that Saudi-Arabia's ability to stabilize world oil markets could be at risk if domestic energy demand continues to rise (National Geographic News, June 2012).

China is the largest energy consumer globally and one of the few countries in the world that subsidizes coal. Because of high domestic demand, China now consumes more coal than the United States, the European Union, and Japan combined (National Geographic News, June 2012). The country is also leading the world demand for oil because of growing automobile ownership. In fact, it is predicted that China will surpass the United States with a vehicle fleet amounting to 390 million cars by 2030 (National Geographic News, June 2012).

The politics of fossil-fuel subsidies have caused demonstrations around the world. India deregulated the prices of petrol in 2010 and oil companies were subsequently responsible for price adjustments. As just one of many examples, a 2011 gasoline price increase of only INR 3.00 (roughly USD 0.05)[2] provoked nationwide political and public outrage (NDTV, September 2011). In Egypt, export revenues from the petroleum sector are swallowed up by increasing domestic demand (EIA, Egypt Analysis Brief). As a result, the country needs to import large volumes of oil. However, shortages of subsidized fuels have become prevalent when the government lacks sufficient credit. In part, worsened conditions like these were one of the reasons behind the uprising during the Arab Spring that led to the eviction of President Mubarak (National Geographic News, June 2012).

[2] 1 INR ≈ 0.0164 USD – 25/04/2014 http://www.indexmundi.com/xrates/table.aspx

Fossil fuel subsidization has even agitated deadly conflicts. Venezuela's government has used its oil wealth to gain popular support for a long time, and the country now holds the record for the lowest fuel prices in the world (GlobalPetrolPrices.com, January 2014). Moreover, these fuel prices have become politically untouchable ever since 1989 where a gasoline price increase caused hundreds of people to die in riots (New York Times, January 2014). Fuel price increases have also sparked lethal insurgencies in recent times. In September 2013, 24 people were killed in the Sudanese capital Khartoum from turmoil that began when the government announced unpopular fuel price increases (BBC September, 2013)

Stories like these indicate that petroleum product subsidies are a politically sensible issue. Fortunately, awareness is growing and efforts are being made. During a summit in Pittsburg in September 2009, the G-20 leaders committed to “rationalize and phase out over the medium term inefficient fossil-fuel subsidies that encourage wasteful consumption” (IEA et al. 2010, p.5). As the last member country of this powerful group, Indonesia represents one of the countries where the above agenda is particularly urgent. However, as will be stressed, removing fossil-fuel subsidies in Indonesia is an immense task for the government to undertake.

2. Fossil-Fuel Subsidies in Indonesia

In 2011 Indonesia was ranked the largest consumer of fuel products in Southeast Asia and fossil fuels are expected to continue dominating the country's future energy demand (IEA 2013, p.52). Subsidization of fossil fuels is also likely to continue, despite a substantial fuel price increase in June 2013. In the following, aspects of the Indonesian subsidy scheme will be described in detail.

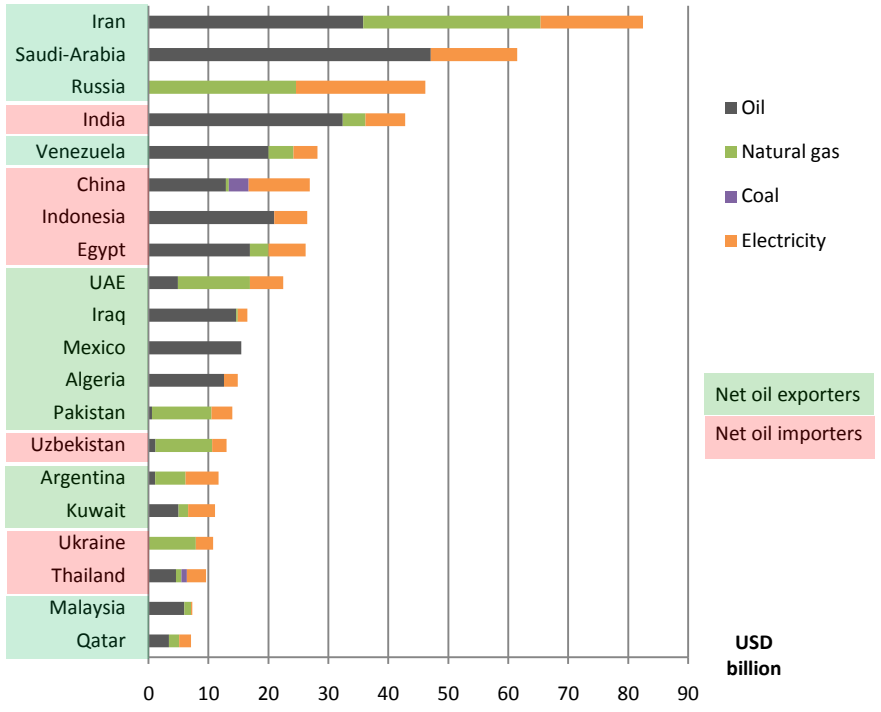
2.1 International Comparison

The International Energy Agency's subsidy index lists each country's energy subsidy rate as a proportion of the full cost of supply (IEA, Subsidy Index 2012). According to this index however, as presented to the left of figure 2.1, Indonesia barely makes it as one of the top 20 energy subsidizing countries in the world. With an average subsidization rate of 28.3%, Indonesia falls particularly far behind several Middle East and North African (MENA) countries. Notably, this group is spearheaded by Kuwait with an average subsidization rate of 96%, or a subsidy per person of USD 3,933 (IEA, Subsidy Index 2012).

However, the IEA subsidy index is calculated in a way that perhaps distorts the perception of Indonesia. An average subsidization rate of 28.3% implies that Indonesian consumers, on average, pay 71.7% of the competitive market prices for petroleum products (IEA et al. 2011, p.5). In other words, the higher the average subsidization rate, the less people pay compared to what the actual price should be. Still, total subsidy costs will naturally be higher in countries with larger populations. For Kuwait for instance, it is relatively less expensive to lower the domestic price of fuels for its 2.7 million inhabitants (CIA World Factbook). For Indonesia on the other hand, the total costs associated with subsidizing 250 million people are substantially greater. Thus, by comparing the economic value of subsidies for each country instead, as depicted in figure 2.1, Indonesia is placed in the top echelon.

Country	Average subsidization rate (2012)
Kuwait	96.0%
Venezuela	82.0%
Libya	80.2%
Saudi-Arabia	78.9%
Qatar	75.1%
Iran	73.8%
UAE	64.1%
Iraq	62.4%
Uzbekistan	60.9%
Algeria	56.7%
Egypt	53.7%
Ecuador	51.5%
Bangladesh	51.0%
Turkmenistan	48.9%
Azerbaijan	37.4%
Pakistan	37.3%
Bolivia	31.9%
Angola	31.1%
Kazakhstan	29.1%
Indonesia	28.3%

Figure 2.1: Top 20 Subsidizing Countries, 2012



Source: IEA Subsidy Index

Focusing on oil subsidies in particular, Indonesia is ranked the fourth largest subsidizing country in the world from this list. Moreover, Indonesia emerges as the second largest oil subsidizing country with a status of being a net oil importer, only surpassed by India. Most other countries practicing oil subsidies are net oil exporters. Arguably, because these countries tend to be well off due to their oil wealth, they are consequently better positioned to subsidize petroleum products. In addition, for many of the comparable net oil importers such as Uzbekistan and Ukraine, oil subsidies constitute only a negligible part of their combined subsidies. In sum, compared to other presumably identical countries, the Indonesian subsidy scheme is conceivably more pressing and less sustainable.

2.2 Key Macroeconomic Indicators

To better understand the Indonesian subsidy scheme it is important to acquaint oneself with the macroeconomic circumstances. Indonesia has experienced strong economic growth ever since the 1997 Asian financial crisis, and during the global financial crisis of 2007-08 the country joined China and India as the only G20 members posting growth (CIA World Factbook).

Table 2.1 presents recent economic indicators (2012), and compares these with figures from 10 years back. In short, these numbers testify of a rapid economic growth the last decade. With a GNI per capita of USD 3,420 Indonesia is now classified as a lower-middle-income economy by the World Bank (World Development Indicators). The country also has the second largest GDP growth rate in the G20 following China. Moreover, with a nominal GDP of approximately USD 880 billion, Indonesia was ranked the 16th largest economy in the world in 2012 (CIA World Factbook).

Table 2.1: Key Macroeconomic Indicators (2002 vs. 2012)

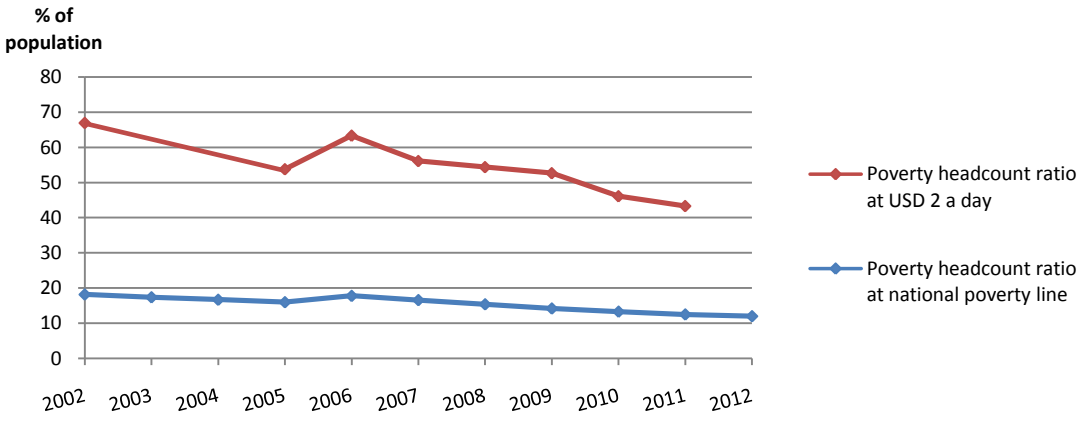
Indicator	***2002***	***2012***
Population (mill.)	212.0	246.9
Nominal GDP (current USD bn.)	195.7	878.0
GDP growth (annual %)	4.5	6.5
GNI per capita, Atlas method (current USD)	730	3,420
Poverty headcount ratio at NPL (% of population)	18.2	12.0
Poverty headcount ratio at USD 2 a day (% of population)	67.0	43.3

Source: World Development Indicators; CEIC data

Despite these positive trends, Indonesia is still defined as a developing country by the World Bank (World Development Indicators). The country struggles with a range of challenges including high unemployment, inadequate infrastructure, corruption, and unequal resource distribution between regions (CIA World Factbook). Moreover, poverty is a still a pressing issue despite major progress the last decade. In 2012, 12% of the population was classified as being poor according to Indonesia's own national poverty line. This was set at USD 22 per month, or less than USD 1 a day (World Bank, Indonesia Overview). However, the World Bank defines poverty as living on less than USD 2 a day. In accordance with this, almost half the Indonesian population would be defined as poor. Figure 2.2 displays the large disparity

between these two measures. The fact that both ratios are declining has been attributed to Indonesia's fast growing middle class (IEQ December 2013, p.28).

Figure 2.2: Poverty Headcount Ratios Compared



Source: World Development Indicators; CEIC data

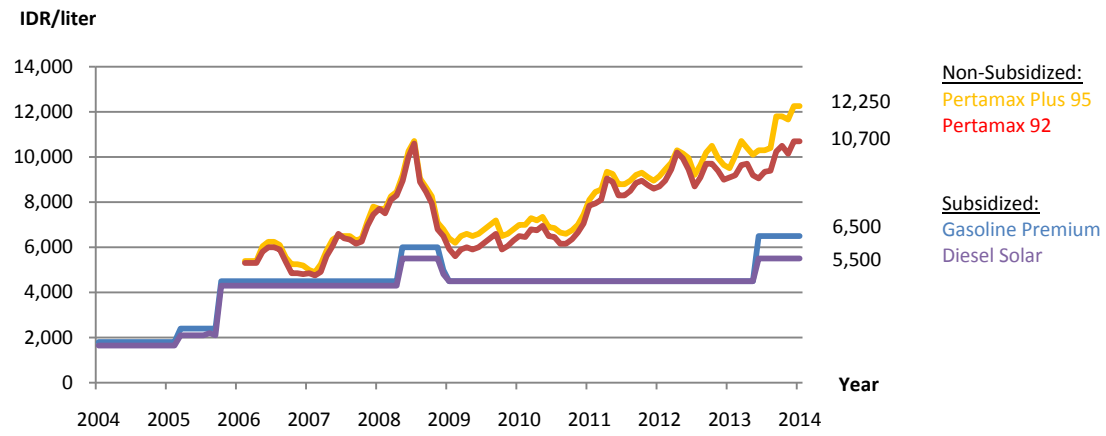
In 2010 BBVA Research classified Indonesia as one of the Emerging and Growth-Leading Economies (EAGLEs) which by definition were expected to lead global growth in the next 10 years (BBVA Research, 2014). In short, this is just another indicator of Indonesia's economic potential. At the same time it is just another reason to question why the country commits to a seemingly inefficient subsidization policy.

2.3 Features of the Indonesian Subsidy Scheme

The Indonesian government subsidizes two of the four main transport fuels, namely gasoline "Premium" and diesel "Solar" (Tumiwa et al. 2012, p.9). The government also subsidizes kerosene, liquefied petroleum gas (LPG), and electricity to varying degrees (IEA 2012, p.72). Premium and Solar are exclusively distributed by Pertamina, Indonesia's state-owned oil company. The prices and coverage of these are determined by the government, which directly recompensates Pertamina for its sales (Bacon and Kojima 2006, p.161).

Other higher-performing fuels, specifically “Pertamax” and “Pertamax Plus”, are also supplied by multinational companies. The prices for these are regularly updated to reflect international oil prices (Tumiwa et al. 2012, p.9). By comparison, the prices of Premium and Solar are changed only on an ad-hoc basis at irregular intervals. Figure 2.3 displays the retail price movements of the four mentioned transport fuels the last 10 years.

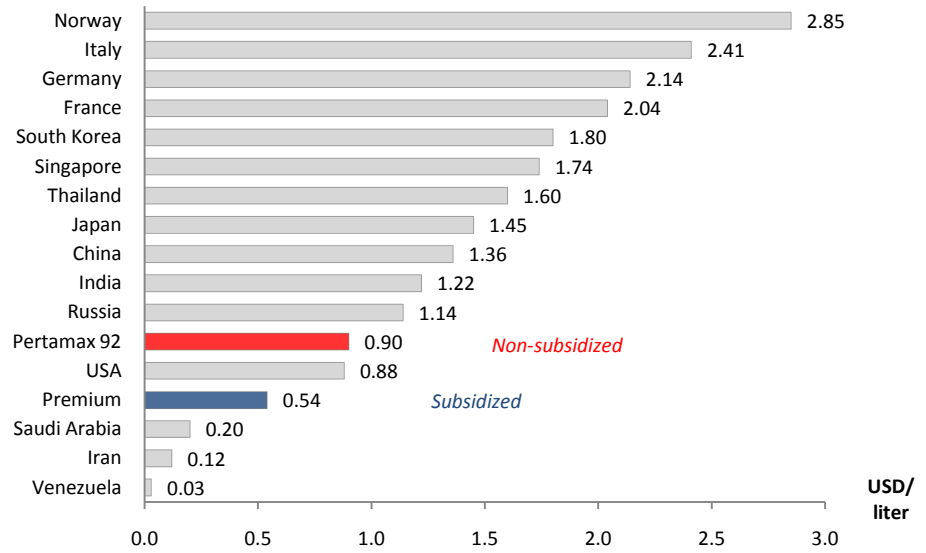
Figure 2.3: Subsidized vs. Non-Subsidized Fuels



Source: CEIC data

Figure 2.4 compares fuel prices across selected Asian and major economies. As depicted, the non-subsidized fuel prices in Indonesia are already among the lowest in the world, and the country falls even further down the list when taking subsidized fuels into account. In fact, gasoline Premium is ranked the cheapest fuel among the Association of South East Asian Nations (ASEAN) member countries (Tumiwa et al. 2012, p.9).

Figure 2.4: Fuel Price Comparison across Selected Asian and Major Economies



Source: GlobalPetrolPrices.com, January 2014

As noted, the Indonesian government also subsidizes the price of kerosene. Kerosene is a light petroleum distillate commonly used for cooking, lighting, and heating, which is especially important for households not connected to an electricity grid (EIA, Glossary). Because kerosene can be sold in very small amounts, it is widely regarded as a "fuel for the poor" (Bacon and Kojima 2006, p.19). Notably, kerosene is especially attractive to credit constrained low-income households who cannot afford lumpy expenditures. For this reason, kerosene is almost universally regarded as a "social fuel", and several governments have historically kept its price low to support poor households (Bacon and Kojima 2006, p.19).

2.4 Brief History of Fossil-Fuel Subsidies in Indonesia

Subsidies have been a hallmark of the Indonesian economy ever since its independence from the Netherlands in 1949. Led by Sukarno, the country's first president, the government financially assisted several ex-Dutch state-owned enterprises as part of a broader strategy to stabilize the country politically and economically (Beaton and Lontoh 2010, p.2). By consistently using public sector spending to stimulate the economy, these government interventions eventually led to severe inflation pressures. As a result, subsidies

for rice and fuel were introduced to support the incomes of poor households and to protect the people from inflation effects (Beaton and Lontoh 2010, p.2).

Sukarno's "Guided Democracy" came to an end in the mid-1960s and a new government emerged led by General Suharto. Despite this "New Order" of more liberal economic governance and consequent attempts of raising the fuel prices, the government was never able to end the subsidization scheme (Beaton and Lontoh 2010, p.2). Indonesia did however experience strong economic growth under General Suharto, boosted by the 1973 oil embargo and the "Oil boom" era of the early 1980s. This continued until the devastating effects of the 1997 Asian financial crisis (Beaton and Lontoh 2010, p.3). The government was then forced to announce considerable price increases for fuel and electricity, which resulted in violent protests and insurgency against the regime. This is still believed to have caused the downfall of General Suharto, which stepped down from office in 1998 (Bacon and Kojima 2006, p.159).

Since the fall of the "New Order" fuel price increases have occasionally led to significant opposition and even violent public protests. Some of this resistance has been attributed to a general dissatisfaction with the Indonesian government. In turn, this goes back to the Suharto era where the authorities were known for "korupsi, kolusi dan nepotisme" – corruption, collusion and nepotism (Beaton and Lontoh 2010, p.3). Between 2000 and 2003 the government announced numerous fuel price increases, but most of these were ultimately rolled back.

Subsidy cuts again became politically feasible from 2004 thanks to the credibility of the new government led by Susilo Bambang Yudhoyono (Beaton and Lontoh 2010, p.8). Since then, as presented in table 2.2, the Indonesian government has successfully completed a handful of fuel price amendments. For instance, in October 2005 the prices of subsidized gasoline, diesel and kerosene were raised by 88%, 105% and 186% respectively. Together with the former March 2005 fuel price increase, this caused fuel subsidies as percentage of GDP to decline by 1.6% by the next fiscal year (in 2006). Note that because the prices and coverage of subsidized fuels are determined by the Indonesian government, a price increase is generally understood as a subsidy reduction.

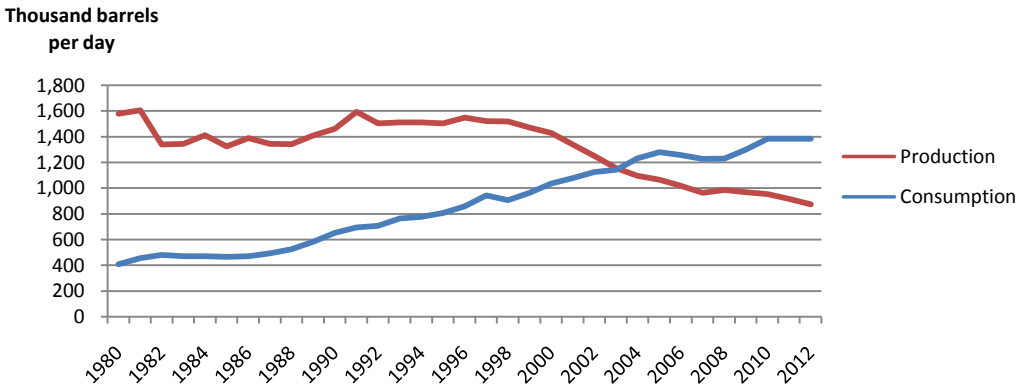
Table 2.2: Successful Reform Attempts

Reform episode	*Gasoline price increase*	*Diesel price increase*	*Kerosene price increase*	*Decline in subsidies as % of GDP*
Mar-05	33%	27%	0%	1.6%
Oct-05	88%	105%	186%	
May-08	33%	28%	25%	2.0%
Jun-13	44%	22%	0%	N/A

Source: CEIC data; own calculations

Considering Indonesia's high oil production towards the end of the 20th century, fossil-fuel subsidies remained correspondingly affordable. However, the situation changed as economic growth caused oil consumption to increase after the millennium. As illustrated by figure 2.5, Indonesia went from being a net oil exporter to becoming a net oil importer in 2004, and consequently suspended its OPEC membership in 2009 (Tumiwa et al. 2012, p.7). Since the switch, it has become increasingly difficult for Indonesia to finance fuel subsidies through revenues from the petroleum sector and to let the people benefit from its oil wealth. Still, it did not prevent the country from exporting oil. Due to insufficient domestic refining capacity Indonesia continues to export crude oil and condensates to maintain market access and oil revenues when international oil prices are high (EIA, Indonesia Analysis Brief).

Figure 2.5: Oil Production and Consumption



Source: EIA International Energy Statistics

2.5 Complexity of Removal

Given its status as a net oil importer, questions have been raised as to why Indonesia continues to subsidize fuels. As noted, the government has struggled to convince its people about the benefits of subsidy removal. In a study conducted by Pradiptyo and Sahadewo (2012), 335 households were questioned on how to best phase out the subsidies. The results showed that gradual elimination of the fuel subsidies was perceived to be the most acceptable phase-out strategy (Pradiptyo and Sahadewo 2012, p.18). Furthermore, it was found that direct subsidy removal would be perceived as a loss as opposed to a foregone gain (Pradiptyo and Sahadewo 2012, p.4). In other words, an endowment effect makes Indonesians feel as if they are not subsidized when purchasing subsidized fuels.

Inability to phase out fossil-fuel subsidies can also be linked to inefficient politicians. Victor (2009) emphasizes how subsidies need to be understood in the context of political economy, in which governments act with a short-term goal of staying in power. The idea is that governments, dependent on voters for survival, refrain from pushing for subsidy reforms before elections because they realize how unpopular such initiatives can be (Victor 2009, p.14). As will be discussed, this is particularly relevant for Indonesia where the legislative elections just recently have been completed.

3. Impacts of Fossil-Fuel Subsidies

Impacts of fossil-fuel subsidies can be highly interconnected. In an attempt to separate the effects, the following section will explore the economic, environmental, social and fiscal costs of fuel subsidization sequentially. The latter category will include elements that could have been incorporated under economic costs, but these will be treated last as they better illustrate the foregone alternative spending. First however, it is convenient to review how petroleum product subsidies affect welfare.

3.1 Welfare Impacts

The subsidies granted in Indonesia are commonly referred to as consumer subsidies (Mourougane 2010). As noted, these are designed to reduce the cost for end-users. In terms of economic modelling, consumer subsidies cause as an outward shift of the demand curve. Accordingly, consumers are supported by the government to buy more fuel (than they otherwise would) at a lower price.

Figure 3.1: Effects of Fossil-Fuel Subsidies

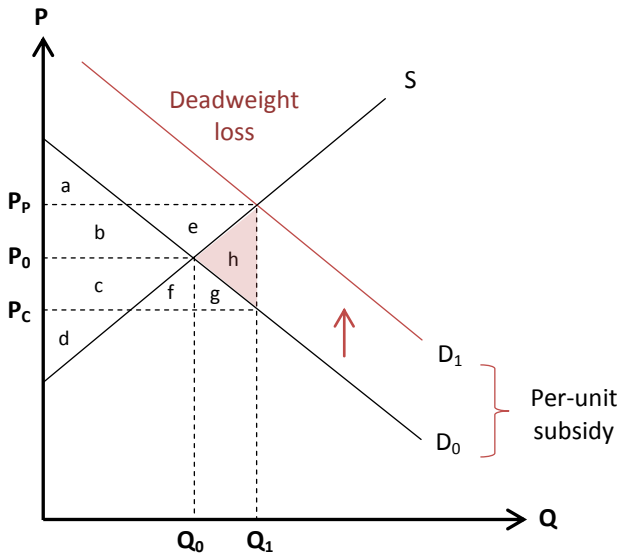


Figure 3.1 shows the economic effects as the Indonesian government subsidizes the prices of gasoline Premium, diesel Solar and kerosene. Treated as one case, the demand curve shifts

up to D_1 with a distance equal to the amount of the subsidy. This causes the consumer end-price to drop down to P_C. Consumers are made better off because they are able to buy more fuel to a lower price. The supplier Pertamina is also better off since the subsidy raises the seller's price to P_P. Considering the market impacts, the subsidy appears to bring advantages to all. Yet, someone has to bear the cost of the subsidy, consequently becoming worse off. That "someone" is the government and ultimately the taxpayers.

Table 3.1: Welfare Impacts of Fossil-Fuel Subsidies

	Free market	*After subsidy*	*Change*
Consumer surplus	a+b	a+b+c+f+g	c+f+g
Producer surplus	c+d	b+c+d+e	b+e
Govt. cost	0	b+c+e+f+g+h	b+c+e+f+g+h
Net benefit		h	-h

The overall effect on welfare is given by table 3.1. Net benefits equal the change in consumer surplus plus the change in producer surplus minus the subsidy payment. These turn out to be negative ($-h < 0$), which means that the gains to the market participants are worth less than the cost to the taxpayers. A deadweight loss arises because the last Q_1-Q_0 units cost more to produce than consumers are willing to pay. The exact size of the deadweight loss will depend on the responsiveness of producers and consumers to changes in prices, i.e. the elasticities of demand and supply. Notably, there is evidence that the price elasticity of fuel demand is relatively low (at least in the short-term), in which case the demand curve would be steeper than the one depicted above (Bacon and Kojima 2006, p.165). Regardless of its size, this model fails to incorporate how additional deadweight loss arises from a foregone opportunity cost. This will be explored further in section 4.

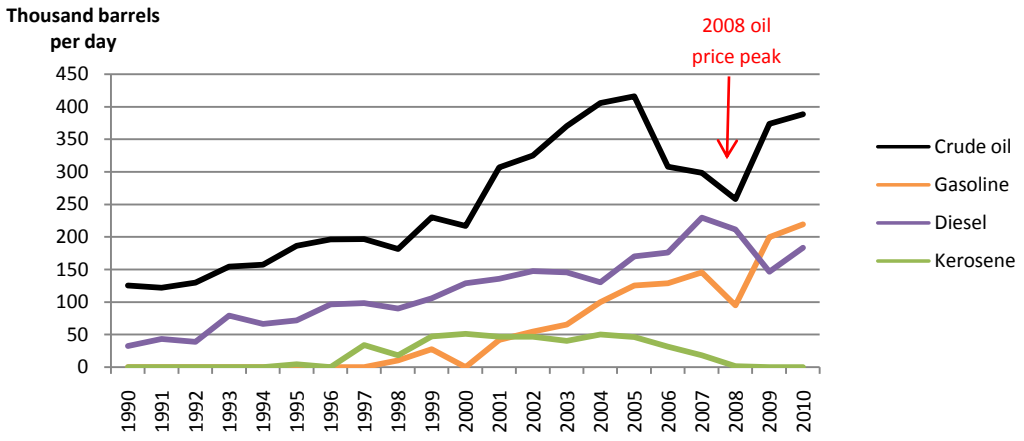
As a general case however, the model highlights how fuel subsidies lead to wastages from both the consumers who engage in unnecessary fuel consumption, and from the government which spends a large sum of resources on subsidies. In addition to the pure deadweight loss, petroleum product subsidies also entail adverse distributional effects. Amongst others, this has been demonstrated by Arze del Granado et al. (2010). In a review of how household welfare is affected by fuel subsidy reforms, they took the poorest 20% of households in twenty developing countries (from Africa, Asia, the Middle East, and Latin America) and defined these as "poor". It was found that the cost to the budget of transferring USD 1 to the

poor via gasoline subsidies was around USD 33 (Arze del Granado et al. 2010, p.13). In other words, for every USD 1 of subsidies granted, only USD 0.03 arrived to the poor. As will be discussed later on, this reflects that most of the subsidy benefits "leaks" to the rich. For kerosene, the poorest 20% of households received USD 0.19 of every USD 1 subsidized (Arze del Granado et al. 2010, p.13). Clearly, fuel subsidization is a wasteful way of using public resources and it leads to a sub-optimal allocation of resources.

3.2 Economic Costs

Fossil-fuel subsidies blur price signals by setting the end-user price of a product below the prevailing market level (Mourougane 2010, p.11). This way, the subsidies fail to reflect the true economic costs of supply. Consumption and investment decisions consequently become distorted, and this leads to a loss of economic efficiency. One way this happens is through over-consumption of energy, which follows when low prices stimulate demand (UNEP 2008, p.12). This increases the demand for energy imports, which ultimately can make the country more import-dependent and threaten the country's energy security. Figure 3.2 shows Indonesia's import levels of crude oil and selected refined petroleum products the last 20 years. On average, these levels have increased with the exception of kerosene.

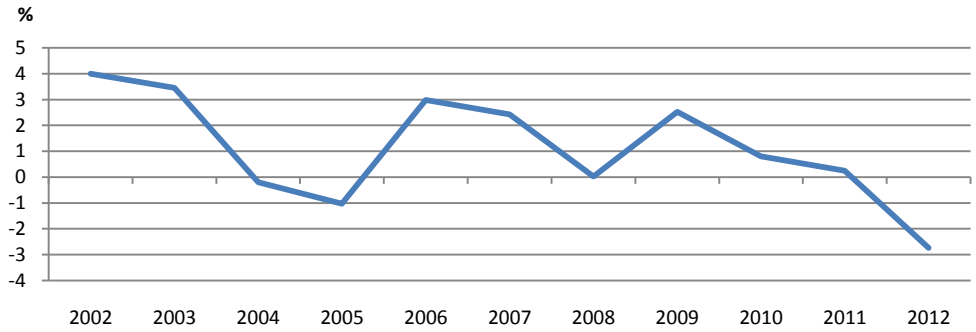
Figure 3.2: Selected Petroleum Product Imports



Source: EIA International Energy Statistics

In turn, higher import levels are likely to affect the balance of payments since changes in prices of imports subject to the subsidy influence trade flows (World Bank 2010, p.37). Figure 3.3 shows Indonesia's current account balance as % of GDP the last ten years. Notably, current account deficits have appeared each time the above import levels have peaked, both in 2004-2005 and from 2011 and onwards. This has wielded heavy pressure on the country's balance of payments. As an extension the Indonesian rupiah has become Asia's worst performing currency in recent years, having depreciated by more than 25% during 2013 (Jakarta Post, January 2014).

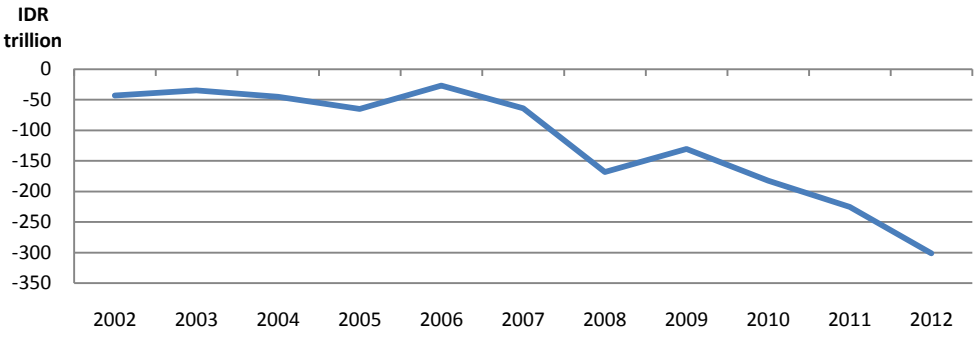
Figure 3.3: Current Account Balance (% of GDP)



Source: EconStats

Ultimately, greater energy demand may also affect the terms of trade negatively for fossil-fuel importers (World Bank 2010, p.37). As can be seen from figure 3.4, Indonesian terms of trade have deteriorated the last decade. Molnar and Lesher (2008) partly attribute this trend to the sharp rise in oil prices since the millennium, which eventually led Indonesia to become a net oil importer (2008, p.11). Of course, deteriorated terms of trade do not necessarily define an entire country's economic health. Still, higher demand for fossil fuels has clearly contributed to an aggravated trade balance for Indonesia.

Figure 3.4: Terms of Trade Adjustment (constant LCU)



Source: World Development Indicators

Impeded competition is another economic cost of fuel subsidies. As noted, the state-owned oil company Pertamina operates as the sole supplier of subsidized fuels in Indonesia. Other private foreign firms are allowed to sell higher-octane fuels, but these products can be up to 50% more expensive than the subsidized fuels (Mourougane 2010, p.12). However, distribution rights for subsidized fuels were awarded to two private companies in 2009 (Jakarta Globe, December 2009). Still, these were restricted to distribute small amounts and prohibited from operating on the island of Java, the largest market (140 million people – Statistics Indonesia). Thus, Pertamina continues to hold a monopoly on the distribution of subsidized fuel in practice.

Subsidization of fossil fuels can also result in a range of unintended economic impacts. One of these is related to the price disparities across borders. In Indonesia, smuggling of fuels to neighboring countries where the selling price is higher has been a common problem (Mourougane 2010, p.12). Price differences within Indonesia have also caused problems. Specifically, illegal fuel substitution has occurred when the prices of fuel products differ substantially. When this happens, kerosene originally intended for household cooking is commonly used to adulterate gasoline (Bacon and Kojima 2006, p.17). This not only has negative consequences for vehicle performance but also for the environment in general.

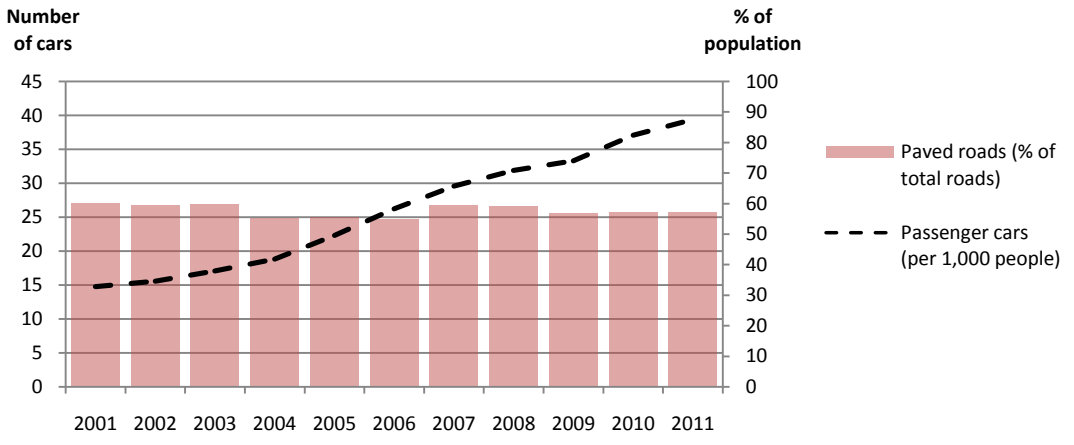
Economic inefficiency is usually defined as a situation in which resources are sub-optimally allocated. In this context however, it is the multiple negative economic effects which suggest that petroleum product subsidies are economically inefficient.

3.3 Environmental Costs

Fossil-fuel subsidies also entail large environmental costs. Even though the short-term price elasticity of fuel demand might be relatively low, cheap fuel prices arguably create higher demand and consumption in the long-term. Not surprisingly, over-consumption of polluting petroleum products inevitably entails harmful effects on the environment. According to UNEP, there is strong evidence showing that petroleum product subsidies contribute to higher greenhouse-gas emissions and exacerbate climate change. Specifically, increased production and consumption of fossil-fuels leads to air pollution, resource depletion, as well as pollution of water supplies (UNEP 2008, p.15).

In Indonesia, air pollution has become a particularly burdensome problem in the major cities due to traffic congestion. This has had large negative impacts on the air quality because slower moving traffic emits more pollution than when vehicles move at freeway speeds (Environmental Leader, January 2012). Although traffic congestion has various reasons, the prevailing view is that cheap subsidized fuel combined with an increase in private vehicle ownership has been the greatest contributor to the problem (Jakarta Post, January 2013).

Figure 3.5: Selected Urban Development Indicators



Source: World Development Indicators

Figure 3.5 displays selected urban development indicators for Indonesia the last ten years. The number of passenger cars per 1,000 people is listed on the left axis and the percentage of paved roads on the right axis. The figure shows how private vehicle ownership has increased steadily the last ten years. This can be attributed to cheap subsidized fuels and rising

incomes which have made it easier for Indonesians to service the costs of having a car. Meanwhile, the percentage of paved roads has stayed relatively constant, which indicates that infrastructure has not been developed in the same pace.

The statistics in figure 3.5 do not apply to cities alone but still suggests the root causes of traffic congestion, which in turn has resulted in air pollution. The situation is most severe in Jakarta, the leading city both in terms of subsidized fuel use and in terms of vehicle concentration (Jakarta Globe, December 2013). In fact, in 2012 Jakarta was ranked the number one polluting city in the world with a pollution index of 146.25 (Numbeo Pollution Rankings, 2012)[3]. For this estimate the biggest weight was given to air pollution, then to water pollution/accessibility, whereas smaller weight was given to other pollution types. However, it should be stressed that this ranking is somewhat unofficial.

Another environmental impact of fossil-fuel subsidies is related to technological advances. Specifically, lower energy prices can make the entire energy sector less attractive by reducing the return on investment (Mourougane 2010, p.11). In turn, this hampers the development of renewable technologies and reduces incentives to conserve or use energy more efficiently. That way, subsidization of fuels can stand in the way of commercializing new technologies that utilize cleaner energy sources.

In sum therefore, these impacts indicate that fossil-fuel subsidies are environmentally harmful. Also, the effects suggest that there is a possible "double dividend" from eliminating subsidies of fuel. Not only would the economy allocate its resources more efficiently, it would combat climate change too.

[3] Numbeo Pollution Rankings, 2012: http://www.numbeo.com/pollution/rankings.jsp?title=2012-Q1

3.4 Social Costs

Fossil-fuel subsidies were introduced in Indonesia to make energy accessible and affordable for low-income households. The subsidies were intended to increase household incomes in two ways. First, by paying less for fuel, households would have more disposable income to spend on other goods. Second, these goods would be cheaper as subsidies reduced energy input costs for producers (Tumiwa et al. 2012, p.16). However, although fossil fuels are subsidized, the poorest households might be unable to afford them. Even if they do, the financial value to poor households might be negligible since their consumption generally is modest (UNEP 2008, p.14).

A number of reports have reached such conclusions, stating that benefits mainly accrue to high-income households. In fact, the government of Indonesia is well aware of these distributional effects themselves. In 2008 the Coordinating Ministry for Economic Affairs reported that the wealthiest 40% of households enjoyed 70% of the subsidies, while the bottom 40% of low-income households benefitted from only 15% of the subsidies (Mourougane 2010, p.13). Similar conclusions can be reached by examining household expenditure data. Specifically, expenditure patterns for petroleum products can provide evidence of how fossil-fuel subsidies accrue to different segments of the population.

The Indonesian National Socio-Economic Survey (also known as "SUSENAS") is carried out by the Central Statistical Agency (BPS) every year. However, the presented results might differ as various questionnaires are used from time to time. For an analysis as described above, SUSENAS 2011 (1st quarter) is a suitable version. SUSENAS 2011 covers about 75,000 households spread all over Indonesia and provides average monthly expenditures per capita for a range of food and non-food items. As reproduced by table 3.2, households are divided into eight quintiles depending on their monthly average per-capita expenditures (Statistics Indonesia 2011, p.31). These range from less than IDR 100,000 (roughly USD 10) per month to IDR 1,000,000 (roughly USD 100) per month and more[4].

[4] 1 IDR ≈ 0.00009 USD – 25/04/2014 http://www.indexmundi.com/xrates/table.aspx

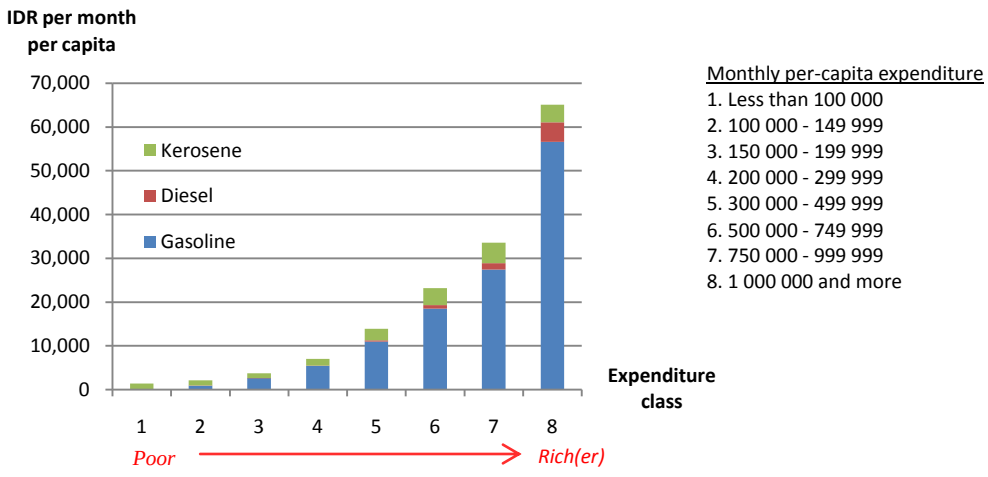
Table 3.2: Avg. Monthly Expenditure per Capita – Fossil Fuels

Expenditure class	*Less than 100 000*	*100 000 - 149 999*	*150 000 - 199 999*	*200 000 - 299 999*	*300 000 - 499 999*	*500 000 - 749 999*	*750 000 - 999 999*	*1 000 000 and over*	*Per capita average*
Gasoline (IDR/month)	142	895	2,601	5,399	10,937	18,483	27,427	56,604	17,390
Diesel (IDR/month)	-	37	46	111	291	823	1,471	4,474	942
Kerosene (IDR/month)	1,259	1,205	1,060	1,519	2,677	3,856	4,664	4,023	2,846
Share of population	0.1%	1.8%	6.8%	21.6%	30.1%	18.7%	8.7%	12.2%	

Source: Statistics Indonesia (2011) p.31; 110; 113; own calculations

Logically assuming that low expenditures implies low incomes (and vice versa), this figuratively ranks monthly per-capita expenditures from poor to rich(er) households. It should be emphasized that a household with USD 100 in monthly expenditures hardly qualifies as being rich. This last group will include some households just above the poverty line and some very rich households. Still, the division between poor and rich is applicable. Assuming also that consumers pay the same price for fuel regardless of their income, the pattern for fuel product expenditures directly determines the distribution of the fuel subsidies. This can be seen in figure 3.6. Notably, the top quintiles (i.e. the high-income households) are the ones consuming the most fuel. Because fuel subsidies are provided per liter and do not vary depending on income, these households are consequently the ones receiving the greatest share of the subsidies.

Figure 3.6: Consumption of Fuel Derivatives, 2010



Source: Statistics Indonesia (2011)

It should be stressed that the division of the different socio-economic groups does not necessarily reflect its share of the population. For instance, the top quintile represented 12.2% of the population while the bottom quintile represented only 0.1% (in 2011). Also, these numbers express fuel expenditures as a whole, and not necessarily expenditures on subsidized fuels. Still, table 3.2 illustrates noticeable consumption trends for each fuel. Clearly, the likelihood of consuming gasoline rises sharply at higher income levels. This makes sense given that poor households usually have limited vehicle ownership.

With respect to diesel, table 3.2 shows that very few households report any consumption at all, especially the lower-income households. However, poor households can benefit from the diesel subsidies indirectly through lower prices of diesel-intensive goods and services, such as public transit (World Bank 2010, p.75). On the other hand, this would only represent a fraction of the total benefits. For kerosene, it is commonly argued that subsidization is necessary because this essentially represents the only fuel product consumed by the lower income population (Augustina et al. 2008, p.17). Indeed, table 3.2 shows that poor households consume more kerosene than any other fuel. Yet, consumption of this fuel also seems to increase with income level.

In sum, per capita monthly expenditure on fuel products is substantially higher for higher-income households. This is especially the case for gasoline, which further implies that the gasoline subsidy is the most inefficient subsidy. The subsidies for diesel and kerosene also appear to be regressive in that the benefits mainly accrue to the wealthy. Moreover, because the fuel subsidies are regressive, they are also socially inequitable. The problem is that these subsidies are distributed universally as opposed to being targeted for the poor exclusively. As a consequence, petroleum product subsidies become extremely costly because a considerable part of the subsidy benefits leaks to higher-income households (World Bank 2010, p.69).

Focus: Using Kerosene Subsidies to Curb Deforestation?

Besides from the social equity argument, kerosene has historically been subsidized on grounds of Indonesia's looming deforestation problem (Mourougane 2010, p.5). By offering the cheaper alternative of kerosene, the idea was to prevent the rural poor from using traditional wood fuels (i.e. wood used for household energy needs, most commonly in the form of firewood or charcoal). In turn, that would reduce deforestation arising from illegal wood gathering (UNEP 2008, p.15). However, it was argued already in the early eighties that the kerosene subsidy would not be an effective means for alleviating the problem. Through an econometric analysis of a large cross-section of households, Pitt (1983) found that the demand for firewood with respect to the price of kerosene (i.e. the firewood to kerosene substitution) was very small (1983, p.215). In other words, lowering the price of kerosene would not reduce the demand for firewood and consequently not deforestation externalities either.

To show this, Pitt (1983) calculated separate sets of price elasticities for different population groups. First, elasticities (and approximate standard errors) were computed for households in four geographic locations: rural Java, urban Java, rural outside Java, and urban outside Java (Pitt 1983, p.208). Then, these elasticities were weighted and summed to create elasticities for larger aggregates. The cross-price elasticities for three of these aggregates are reproduced in table 3.3, notably for rural, urban and (all of) Indonesia. Note that elasticities with respect to the price of woodfuels represent the sum of the two separate elasticities with respect to firewood and to charcoal (Pitt 1983, p.209).

Table 3.3: Cross-Price Elasticities of Demand

	Kerosene		Charcoal		Firewood	
	Price of woodfuels	*Price of kerosene*	*Price of woodfuels*	*Price of kerosene*	*Price of woodfuels*	*Price of kerosene*
Rural	0.081	- 1.069	- 0.684	- 1.219	- 1.103	0.077
	(0.023)	(0.046)	(0.128)	(0.286)	(0.034)	(0.071)
Urban	0.044	- 0.944	- 0.708	- 0.327	- 1.131	0.811
	(0.016)	(0.031)	(0.076)	(0.160)	(0.066)	(0.129)
Indonesia	0.068	- 1.027	- 0.700	- 0.634	- 1.104	0.118
	(0.019)	(0.038)	(0.079)	(0.170)	(0.035)	(0.071)

Source: Pitt (1983), p.209

As can be seen from the table, the cross-price elasticity of kerosene with respect to the other products was lower in rural areas than in urban areas. In other words, increased prices of charcoal and firewood did not have a significant impact on the rural demand for kerosene at the time. According to Pitt (1983), this is because kerosene was primarily used for lighting in rural areas and for cooking in urban areas, in which charcoal and firewood are potential substitutes (1983, p.211). For the country as a whole, it is evident from the bottom right of table 3.3 that the estimated elasticity of demand for firewood with respect to the price of kerosene was relatively low (only 0.118). In addition, Pitt (1983) argued that this firewood/kerosene substitution was not statistically different from zero at a 5% significance level (1983, p.211). The "Method" box below confirms this.

Method:

Estimated cross-price elasticity: $\hat{\beta} = 0.118$

Hypothesis test (two-sided): H_0: $\hat{\beta} = 0$ vs. H_1: $\hat{\beta} \neq 0$

N = 5,880 households

$$t_{stat} = \hat{\beta}/SE(\hat{\beta}) = 0.118/0.071 \approx 1.66 < 1.96$$

$$|t_{stat}| < t_c \quad (5\% \text{ significance level})$$

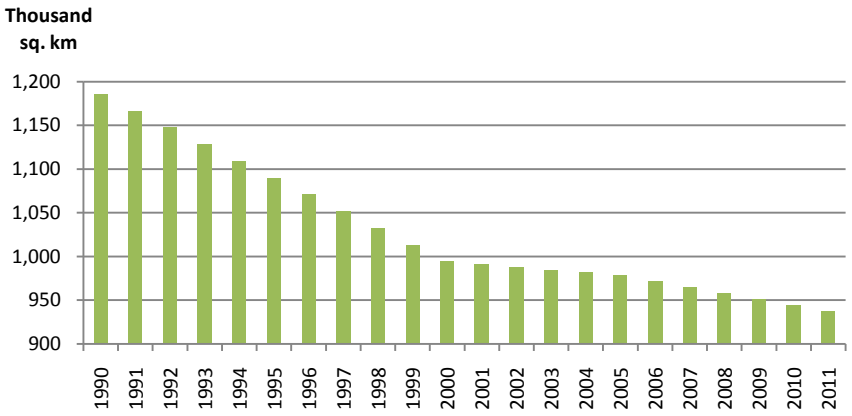
➡ Cannot reject H_0 at 5% significance level

➡ The estimate is <u>not</u> statistically different from zero

Source: own calculations based on Pitt (1983), p.209

Thus, because of this low and statistically insignificant elasticity, Pitt concluded that reducing the price of kerosene would only have a negligible effect on the demand for firewood. Note also that charcoal is a wood product, and its demand elasticity with respect to the price of kerosene is negative, so the elasticity of demand for (all types of) wood with respect to the price of kerosene would be even smaller than 0.118 (Pitt 1983, p.211). In sum therefore, the kerosene subsidies would not have the desired effect in making poor people switch away from wood fuel consumption. Consequently, the kerosene subsidies would also fail in alleviating deforestation.

Figure 3.7: Indonesian Forest Areas



Source: World Development Indicators

Figure 3.7 shows how the volume of Indonesian forest areas has declined since 1990. From this, it appears as if deforestation has slowed down since the millennium. Still, a recent study concluded that Indonesia has experienced the highest deforestation rate in the world between 2000 and 2012, doubling its square kilometers of deforestation per year in that period (Jakarta Post, November 2013). Figure 3.7 also indicates that the rate of deforestation has stepped up in recent years. Logging is the best-known cause of forest loss and degradation in Indonesia, and an estimated 73% of all logging in the country is believed to be illegal (FOEI, 2014). However, it is the conversion of forests for palm oil production which constitutes the main driver behind this, and not necessarily illegal gathering of firewood for household cooking. Thus, the effect of kerosene subsidies in mitigating deforestation appears to be both insignificant and irrelevant.

3.5 Fiscal Costs

In addition to the adverse distributional effects, fuel subsidies can also have substantial impacts on government accounts (World Bank 2010, p.9). In Indonesia, subsidy expenditures are explicitly on-budget and therefore transparent in the government accounts publicized annually by the Ministry of Finance. Moreover, subsidy spending is a centrally governed matter as opposed to other expenditure items that are financed independently by local governments. Before inspecting the government accounts however, it is useful to understand the basis for how subsidy expenditures are calculated.

The price-gap approach is the most commonly applied methodology for estimating the magnitude of fossil-fuel subsidies. It compares the actual price charged from consumers with a reference prices that correspond to the full cost of supply, i.e. the free market price (IEA, Methodology). The price gap is then given by the wedge between domestic and international prices, which in turn indicates the existence of a subsidy (Ministry of Finance 2010, p.2):

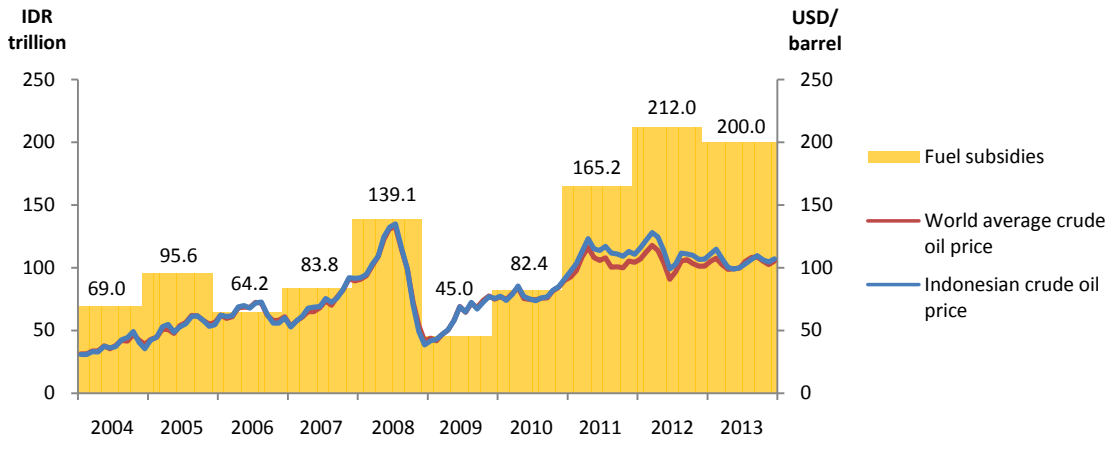
1) Subsidy = [Reference Price – (Retail Price – Tax)] × Quantity

For tradable forms of energy like oil, the reference price is based on international prices and normally adjusted for transport costs and quality differentials (World Bank 2010, p.9). The reference price of oil in Indonesia is based on the Mid Oil Platts Singapore (MOPS), i.e. a measure for crude oil pricing (Ministry of Finance 2010, p.2). In effect, fluctuations in the MOPS set out the course for the Indonesian crude oil price (ICP).

2) Reference Price of Fuel = MOPS + α (α = transport costs and quality differentials)

Based on this formula, the magnitude of fuel subsidies will adjust in accordance with international oil prices, which in turn is reflected in the ICP. Figure 3.8 displays the Indonesian government's fuel subsidy expenditures on the left axis (in trillion IDR), and both the ICP and the world average crude oil price on the right axis (in USD/barrel). Indeed, the magnitude of fuel subsidies has been positively correlated with fluctuations of the ICP for the last ten years. More generally, Indonesia's public spending on fuel subsidies appears to follow global energy movements.

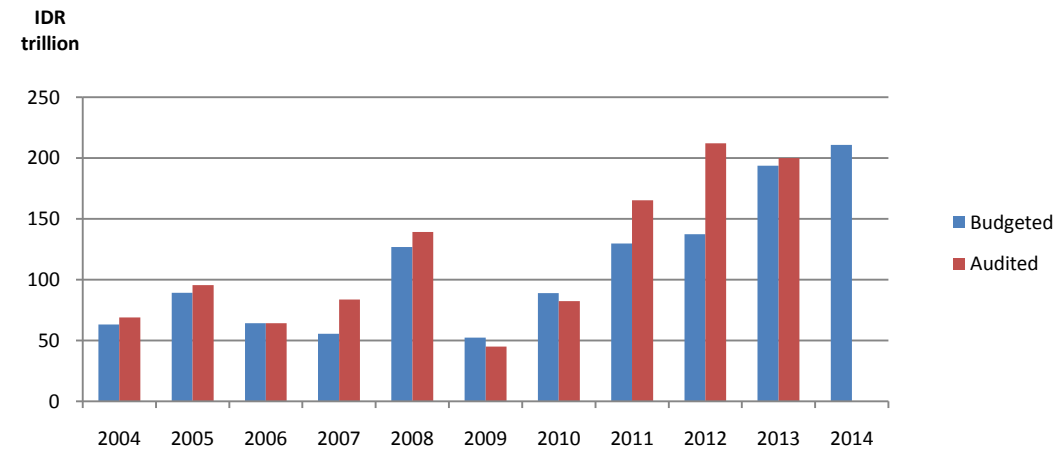
Figure 3.8: Fuel Subsidy Evolvement



Source: CEIC data; Statistics Indonesia

Since international oil prices are procyclical, fuel subsidy spending will increase during global upturns and decrease during recessions (Mourougane 2010, p.12). As an effect, the uncertainty around international oil prices makes fuel subsidy budgeting a challenging task for the Indonesian government. Figure 3.9 compares budgeted and audited fuel subsidies the last decade. Whenever oil prices have soared, like they did in 2008 for instance, the audited fuel subsidies have exceeded the budgeted fuel subsidies.

Figure 3.9: Budgeted vs. Audited Fuel Subsidies



Source: Bank Indonesia

Clearly, fluctuations in international oil prices affect Indonesia's subsidy spending. Table 3.4 shows selected expenditures of the central government the last ten years. As can be seen, subsidies consume a large share of central government expenditures and consequently pose significant costs for the government. Fuel subsidies account for the bulk of subsidies, hovering around 2% of the country's GDP the last decade. Of total state expenditures, the fuel subsidies have accounted for around 10% on average the last ten years.

Table 3.4: Selected Government Expenditures (in trillion IDR)

	2005 audited	*2006 audited*	*2007 audited*	*2008 audited*	*2009 audited*	*2010 audited*	*2011 audited*	*2012 audited*	*2013 audited*	*2014 proposed*
State expenditures	509.6	667.1	757.7	985.7	937.4	1,042.1	1,295.0	1,491.0	1,726.0	1,842.5
Budget surplus	-14.4	-29.1	-49.8	-4.1	-88.6	-46.8	-84.4	-153.0	-224.0	-175.4
Central gov. expenditures	361.2	440.0	504.8	573.4	716.4	725.2	836.6	1,011.1	1,197.0	1,249.9
All subsidies	120.8	107.4	150.2	275.3	138.1	192.7	295.4	346.0	348.0	333.7
Energy subsidies	104.5	94.6	116.9	223.0	94.6	140.0	255.6	307.0	299.8	282.1
Fuel subsidies	95.6	64.2	83.8	139.1	45.0	82.3	165.1	212.0	200.0	210.7
... of CG expenditures	35.9%	15.0%	16.6%	24.3%	6.3%	11.4%	19.7%	21.0%	16.7%	16.9%
... of GDP	3.5%	1.9%	2.2%	2.8%	0.8%	1.3%	2.2%	2.6%	2.1%	1.9%

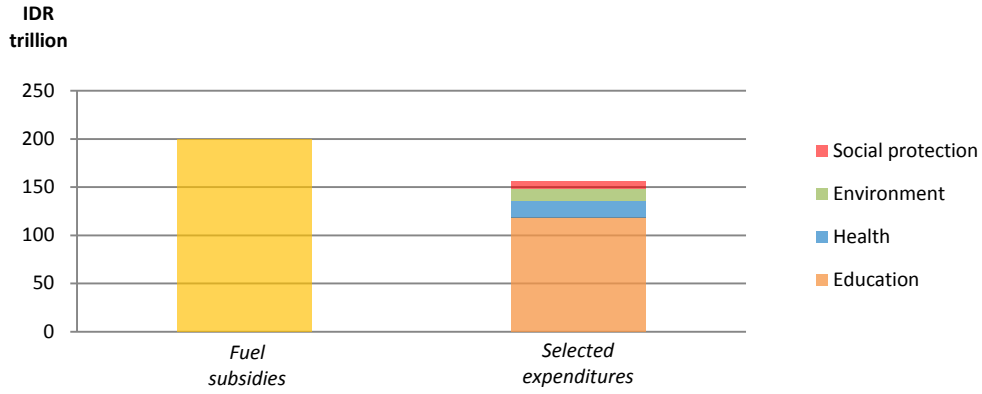
Source: Statistics Indonesia; World Development Indicators; Bank Indonesia; own calculations

Table 3.4 also express how the magnitude of fuel subsidies has escalated over the period. In particular, the increase from IDR 45 trillion in 2009 to IDR 212 trillion in 2012 represented a staggering 370% surge. This has arguably contributed to the large budget deficits in recent years. In 2014, total state expenditures are projected to reach over IDR 1,800 trillion (roughly USD 165 billion)[5]. As a reference, this is less than the Norwegian proposed budget expenditures of about NOK 1,100 billion (roughly USD 180 billion)[6] for the same year (Norwegian National Budget 2014, p.9). Taking into account that the Indonesian expenditures are allocated for roughly 50 times as many people, this underlines the state's budget constraints.

[5] 1 IDR ≈ 0.00009 USD – 25/04/2014 http://www.indexmundi.com/xrates/table.aspx
[6] 1 NOK ≈ 0.1669 USD – 25/04/2014 http://www.indexmundi.com/xrates/table.aspx

Figures from the most recent audited budget highlight the fiscal cost of fossil-fuel subsidies even better. Although not the worst case traceable, the fuel subsidies in 2013 represented about 17% of central government expenditures. As illustrated by figure 3.10, this implied that the central government budgeted more on petroleum product subsidization than it did on social protection, environment, health, and education combined.

Figure 3.10: Selected Government Expenditures, 2013



Source: Ministry of Finance Budget Statistics 2007-2013

Oil revenues only partially offset the impact of fossil-fuel subsidies on the budget. Table 3.5 lists selected revenue items for the central government the last decade. As can be seen, oil revenues have increased far less quickly than other budgetary sources. Specifically, income tax and value-added tax represent the main revenue sources for the Indonesian government.

Table 3.5: Selected Government Revenues (in trillion IDR)

	2005 audited	*2006 audited*	*2007 audited*	*2008 audited*	*2009 audited*	*2010 audited*	*2011 audited*	*2012 Audited*	*2013 audited*	*2014 proposed*
State Revenues	495.2	638.0	707.8	981.6	848.8	995.3	1,210.6	1,338.0	1,502.0	1,667.1
Tax Revenues	347.0	409.2	491.0	658.7	619.9	723.3	873.9	980.5	1,148.3	1,310.2
Income Tax	175.5	208.8	238.4	327.5	317.6	357.1	431.1	465.1	538.8	591.6
VAT	101.3	123.0	154.5	209.7	193.1	230.6	277.8	337.6	423.7	518.9
Non-Tax Revenues	146.9	227.0	215.1	320.1	227.2	268.9	331.5	351.8	349.2	350.9
Oil Revenues	72.8	125.2	93.6	169.0	90.1	111.8	141.3	150.8	120.9	N/A

Source: Bank Indonesia; Statistics Indonesia

In sum, fossil-fuel subsidies constitute a heavy fiscal burden for the Indonesian government. This is especially sobering given the government's original intensions. Specifically, subsidization of fossil fuels was introduced as a fiscal tool to provide benefits to the population. Over time however, this tool has only proven to be fiscally expensive. Furthermore, the tool is becoming increasingly unsustainable as Indonesia is becoming increasingly dependent on oil imports (World Energy Outlook 2012, p.72). Also, given that Indonesia represents one of the world's most thriving economies, one can only imagine where the country would be without this burdensome subsidy policy.

4. The Opportunity Cost

Whilst reducing fiscal space, fuel subsidies simultaneously divert public resources away from spending that could be more pro-poor. This is an example of the opportunity cost of fuel subsidies, i.e. the money that is not spent on other priorities. If the Indonesian government were to cut back on fuel subsidies, it is tempting to examine what the corresponding savings could be used for. Specifically, it seems reasonable to focus on development programs within health and education because these are decisive areas of improvement for developing countries like Indonesia (World Development Indicators). However, infrastructure could just as easily be considered in this regard as well. Despite Indonesia's significant progress, several analysts point out that inadequate infrastructure limits the country in pursuing its ambitious growth targets (Global Times, November 2012).

The following sections will consider two examples of alternative spending in the areas of health and education. First however, a simple calculation will be made to illustrate the amount that could be saved from trimming down the fuel subsidies. The objective will not be to determine what this amount could be translated into precisely, but rather to pinpoint some investment opportunities that could yield high returns if funding was made accessible.

4.1 Savings from Fuel Subsidy Adjustments

A number of studies have attempted to measure the impact of fuel subsidy reductions in several countries worldwide. On an aggregate level, these usually find that subsidy cuts cause positive changes to the countries' GDP because resource allocation becomes more effective (Ellis 2010, p.26). Most of these studies base their calculations on a 25% average fuel price increase (Ellis 2010, p.28).

To find out what amount of savings this would translate into for the Indonesian government today, one can look towards other studies that have used a 25% fuel price increase as a starting point for their calculations. Based on data from 1995, Clements et al. (2007) found that a 25% increase in subsidized fuel prices reduced Indonesian subsidies by a value close to 0.75% of GDP (2003, p.12). Using a similar approach but with data from 2005, Dartanto

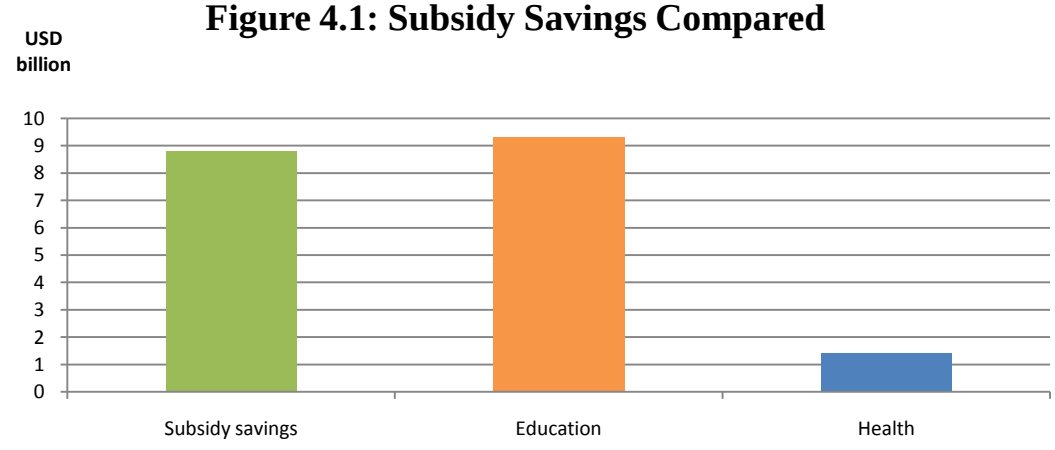
(2012) found that cutting fuel subsidies by 25% would result in government savings of USD 2.52 billion, which represented 0,88% of the Indonesia's GDP at the time (2012, p.19). To facilitate the estimation, it can be assumed for simplicity that a 25% increase in fuel prices would reduce fuel subsidies by a value exactly equal to 1% of GDP. Given that the most recent measure of Indonesia's GDP (in current USD) amounted to USD 878 billion in 2012 (World Development Indicators), 1% of this would represents roughly USD 8.78 billion. Table 4.1 summarizes the approach.

Table 4.1: Calculating Fuel Subsidy Savings

Step 1	Assume a 25% fuel price increase (for subsidized gasoline, diesel and kerosene on average)
Step 2	Assume this would reduce fuel subsidies by a value close to 1% of Indonesia' GDP
Step 3	Indonesia's GDP amounted to USD 878 billion in 2012
Step 4	1% of USD 878 = USD 8.78 billion

The USD 8.78 billion obtained from this straightforward method might appear unreasonably large compared to the USD 2.52 billion Dartanto (2012) calculated. On the other hand, it could be argued that a 25% fuel price increase is an unreasonably modest starting point given Indonesia's history of fuel price increases (Table 2.2: Successful Reform Attempts). As reviewed, in some cases the government has increased subsidized fuel prices by over 100%. Regardless, the amount saved will be tremendous in any event. Furthermore, the amount will merely be used to illustrate what the savings could have been spent for alternatively. Figure 4.1 compares the USD 8.78 billion in fuel subsidy savings to education and health spending by the Indonesian central government from 2012.

Figure 4.1: Subsidy Savings Compared



Source: Ministry of Finance Budget Statistics 2007-2013; own calculations

USD 8.78 billion is almost equal to what the central government allocated to education and it far exceeds what was earmarked for health. Furthermore, USD 8.78 billion (or roughly IDR 97.6 trillion)[7] would have reduced Indonesia's subsidized fuel expenditures by 46% in 2012. That would have reduced subsidized fuel spending from 14.2% to 7.6% of total state expenditures. This illustrates that the savings from cutting fuel subsidies can have large impacts if they were reinvested.

4.2 Investing in Health

Indonesia has made considerable progress on several profound health issues. The Organisation for European Economic Co-operation (OECD) notes that life expectancy at birth has increased by 30 years since 1960, and the infant mortality rate has declined remarkably the past two decades (OECD Health Data, 2013). Still, Indonesia is faced with a range of health problems such as the fastest growing HIV infection rate in Asia (Jakarta Globe, November 2012). Other challenges have emerged in recent years, e.g. the double burden of malnutrition referring to coexistence of both under- and over-nutrition among children (IEQ July 2013, p.40).

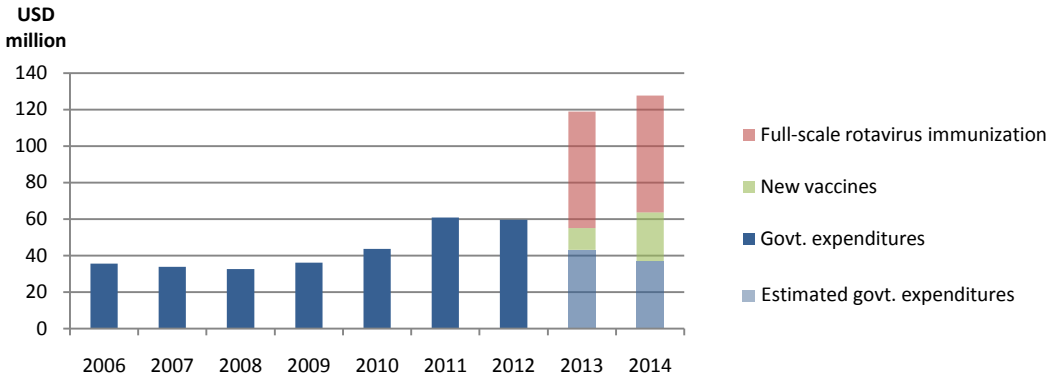
Of health issues where funding stands in the way of progress, rotavirus immunization is a prime example. Rotavirus infection is an acute and life-threatening diarrheal disease which claims the life of over half a million children under five years of age worldwide every year (MCRI, March 2013). For this reason the World Health Organization strongly recommends to include rotavirus vaccines as part of every country's national immunization program, but price continues to be a barrier for most Asian countries – including Indonesia (IRIN, September 2012).

In light of this, Suwantika et al. (2013) conducted a study to assess the cost-effectiveness of introducing rotavirus immunization in Indonesia. They found that, based on a market price of USD 5 per dose, total yearly vaccine cost for a birth cohort of 4.2 million infants (Indonesian birth cohort of 2011) would amount to USD 64 million (Suwantika et al. 2013, p.3305). For each case of immunization, it was found that the combined costs (vaccination + treatment)

[7] 1 IDR ≈ 0.00009 USD – 25/04/2014 http://www.indexmundi.com/xrates/table.aspx

were far below Indonesian GDP-per-capita that year. That way, the study concluded rotavirus immunization to be a highly cost-effective public health intervention for Indonesia (Suwantika et al. 2013, p.3304).

Figure 4.2: Vaccination Expenditures



Source: SABIN Vaccine Institute; NIP (2010)

Figure 4.2 shows reported government vaccine expenditures from 2006 to 2012 and estimated government vaccine expenditures for 2013 and 2014. The estimations were projected by the Indonesian Multi-Year Immunization Plan from 2010. In this, the Ministry of Health planned to introduce several new vaccines at a cost of USD 11.9 million and USD 26.7 million in 2013 and 2014, respectively (NIP 2010, p.55). A gradual introduction of rotavirus vaccination was intended as part of this, but a nationwide scheme is yet to be implemented (MCRI, March 2013).

The impact of full-scale rotavirus immunization is also shown in figure 4.2, at the cost suggested by Suwantika et al. (2013). Adding USD 64 million annually would double the total vaccination budget, but this is only a fraction of the USD 8.78 billion saved from the fuel subsidy adjustments. If realized, the potential effects would be significant. It was estimated that full-scale immunization in Indonesia would reduce rotavirus-diarrhea with nearly 500,000 cases and with over 5,000 deaths annually (Suwantika et al. 2013, p.3303). Given that around 8,000 Indonesian children under the age of five years die from rotavirus infection every year, this means that immunization would reduce child deaths by 62.5% (MCRI, March 2013).

It should be stressed that this calculation simplifies a number of factors, for instance that birth cohorts remain constant and equal to the one used by Suwantika & Postma (2013). Even so, it does indicate how little it would take in terms of fiscal capacity to combat the rotavirus issue.

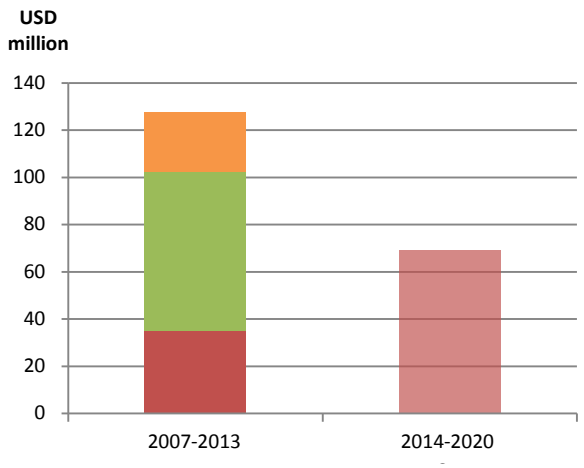
4.3 Investing in Education

In terms of education, as opposed to the reviewed health issue, it is not necessarily the case of spending more but perhaps spending better. The World Bank notes that education has been increasingly emphasized in Indonesia since the economic crisis, and educational spending as a share of GDP is now comparable to other similar countries (World Bank, Education). Still, there is room for improvement. Notably, Indonesia has one of the lowest student-teacher ratios in the world and there are large enrollment gaps between poor and rich children (World Bank, Education).

In 2007 the Indonesian government launched an extensive Early Childhood Education and Development (ECED) project in collaboration with the World Bank. The project was designed to increase access to early childhood services and to improve "school readiness". Specifically, the program was aimed at children from poor families that were found to start school later, complete fewer years of schooling, and have higher dropout rates (World Bank 2006, p.3). The project targeted more than 700,000 children of ages 0-6 from impoverished communities all over Indonesia. 6,000 ECED centers were established during the project period, which came to a close in December 2013 (World Bank 2006, p.21).

The challenge now remains for Indonesia to expand on ECED services in the future. The 2007-2013 ECED project allocated money to three components: community facilitation, teacher training, and block grants for operating the centers (Hasan et al. 2013, p.98). Assuming that the first two components has been successfully established and need no further funding, the future operating costs would only entail continuation of block grants to communities. Based on this, operating the 6,000 ECED centers for 7 more years without World Bank support would amount to roughly USD 70 million. Again, considering that the savings from fuel subsidy adjustments amounted to USD 8.78 billion, this is easily affordable.

Figure 4.3: ECED Commitment Amounts



Total project cost (2007-2013)	USD 127.7 million
Block grants per ECED center	USD 1,647
Number of ECED centers	6,000
Annual block grants	USD 9.9 million
Total block grants (2014-2020)	USD 69.2 million

Source: World Bank (2006), p.63

Figure 4.3 compares the costs of the 2007-2013 project to the costs of the potential 2014-2020 project. Of course, this is a simplified calculation where both operating costs and ECED centers are assumed to stay constant in the future. Still, this underlines that investments in education not necessarily need to be budget-breaking. Adding to this, the World Bank notes that ECED should be a clear candidate for more funding given the low spending from the Indonesian government so far (World Bank 2013, p.103).

For 2014, the national Indonesian education budget was set at IDR 368.8 trillion[8] (roughly 20% of total state expenditures) or approximately USD 33.2 billion[9] (ANTARA News, October 2013). Of this however, the annual cost of running 6,000 ECED centers (USD 9.9 million) would only constitute 0.0000027%. Furthermore, ECED spending would account for only 0.006% of total state expenditures in 2014. This underlines that ECED receive an extremely low share of budgetary resources. Primary and higher education receives disproportionally larger shares (World Bank 2013, p.36).

Specific outcomes of the potential 2014-2020 ECED project is difficult to determine given that the results from the 2007-2013 ECED project are currently being evaluated. Still, some results indicate that the ECED services have been a success, particularly in terms of enrollment rates. The World bank notes that enrollment in ECED reached 50% of all

[8] This number includes central government spending and transfers to regions
[9] 1 IDR ≈ 0.00009 USD – 25/04/2014 http://www.indexmundi.com/xrates/table.aspx

Indonesian 4 to 6 year olds by 2009, which was up from 25% a decade earlier (World Bank 2013, p.15). Specifically, the 2007-2013 ECED project achieved a success rate of 72.9% in terms of enrollment, i.e. of the 738,000 children targeted (World Bank 2012:1, p.11). By operating the centers 7 more years, the 2014-2020 ECED project stands a good chance at including the remaining 200,300 children left to be enrolled, and it could perhaps expand the target group even further.

According to research, ECED investments can also yield several positive indirect effects. As of general short-term benefits, ECED services have been found to improve the nutritional status of children and reduce behavioral problems (Hasan et al. 2013, p.27). Comprehensive studies of long-term effects are yet to be conducted for developing countries, but suggestive lessons can be drawn from other countries practicing similar ECED services. In the United States for instance, it was found that poor children (as compared to better-off children) who did not participate in ECED services were, on average, 25% more likely to drop out of school and 70% more likely to be arrested for a violent crime (Hasan et al. 2013, p.27). Based on this, one can argue that ECED services will ultimately translate into benefits for the society in the form of reduced health care costs and lower crime-related costs.

5. Reforming Petroleum Product Subsidies

Liberalization of fuel prices remains a hotly contested issue in Indonesia and complete removal of the subsidies is by no means accomplished. Paradoxically, the solution seems indisputable. By rationalizing fuel prices to reflect their true costs, savings could be used on targeted pro-poor measures. However, this is not done overnight. Laan et al. (2010) underline that a successful subsidy reform not only entails permanent removal of subsidies, but it must also reduce the short-term impacts of de-subsidization (2010, p.9).

The following sections explores how fuel subsidy cuts will affect the Indonesian economy and how cash transfers can be used as a short-term measure to shield vulnerable households. Furthermore, other mitigating measures will be reviewed and recent developments in Indonesia will be considered.

5.1 Distributive Effects of Subsidy Reductions

Clements et al. (2007) investigate the short-term impacts on the Indonesian economy of raising subsidized petroleum prices by 25%. Using a computable general equilibrium (CGE) model based on data from 1995, they run through the distributive effects step by step. First, the fuel subsidy reduction would *directly* increase petroleum prices, the extent to which depending on the degree of supply elasticity. Second, prices of goods produced in other sectors would increase *indirectly* through the input-output linkages with the petroleum sector (Clements et al. 2007, p.12). However, because the share of the petroleum refining sector in the Indonesia is relatively small (2.5% of GDP in 1995), the increase in the average price level would not be significant (1.1%). Nevertheless, since the overall price level increase, demand subsequently declines. The following drop in production then leads to lower demand for labor and capital inputs. This ultimately reduces household income, which in turn lowers consumer demand further (Clements et al. 2007, p.6). In the end, real output is reduced by 1.6% and real consumption declines by 2.5%.

Ultimately, high-income groups will suffer the most from subsidy reductions because they generally consume the most petroleum products (Clements et al. 2007, p.15). At the other end, lower-income groups usually have larger expenses for agricultural goods, and prices for

these goods tend to be less sensitive to adjustments in domestic petroleum prices. Still, the subsidy cut will affect the poor as well. In particular, urban poor will need to endure reduced employment earnings because production declines the most for the industries that they usually work in, e.g. mining (Clements et al. 2007, p.15). Thus, in the short term, the poverty headcount index will increase modestly by 0.6% (Clements et al. 2007, p.16). In the long run however, the model predicts few adverse effects on the poor. This is because the subsidy reduction will have contributed to adequate macroeconomic stability, in part by less deadweight losses in resource use (Clements et al. 2007, p.17). The economy will be characterized by improved fiscal sustainability, increased social spending by the government, more efficient allocation of resources, and increased investments – all beneficial for the poor.

Table 5.1: Distributive Effects of a Fuel Price Increase

Change in...	Percentage change
Aggregate price level	+ 1.1%
Real output	- 1.6%
Real consumption	- 2,5%
Poverty headcount ratio index	+ 0.6% (short-term)
Govt. subsidy outlays	- 0.75% (of GDP)

Source: Clements et al. (2007) – compared to baseline 1995

The aggregate effects are reproduced in table 5.1. Even though many of these short-term impacts are negative for the economy, notice how the government's subsidy outlays are reduced by 0.75% of GDP. As discussed in section 4.1, this can amount to enormous savings. Still, it is uncertain as to how quickly such effects can be realized for Indonesia. In the short-term therefore, focus should be on providing well-targeted social safety nets for vulnerable low-income households (Clements et al. 2007, p.17). This way, poor households would be protected in the best possible way from any harmful effects of a subsidy reduction.

5.2 The Cash Transfer Assistance Program– BLT

The government of Indonesia has applied several different strategies in order to limit public opposition towards the fuel subsidy reforms. One of these was the Bantuan Langsung Tunai (BLT) – an unconditional cash transfer program launched together with the October 2005 fuel price increase (Beaton and Lontoh 2010, p.17). At that point the government doubled the prices of subsidized gasoline and diesel, and the price of kerosene nearly tripled (Table 2.2: Successful Reform Attempts). To compensate lower-income households for the price increases, the government distributed payments of IDR 100,000 (about USD 10) per month to eligible households over a period of six months (World Bank 2010, p.58). The recipients were identified by a poverty census and amounted to roughly 30% of the population at the time. Moreover, the BLT added cash amounts to a household's budget equal to roughly 15% of regular expenses in 2005 (World Bank 2012:2, p.4). Table 5.2 lists the key elements of the BLT cash transfer program.

Table 5.2: October 2005 BLT Program at a Glance

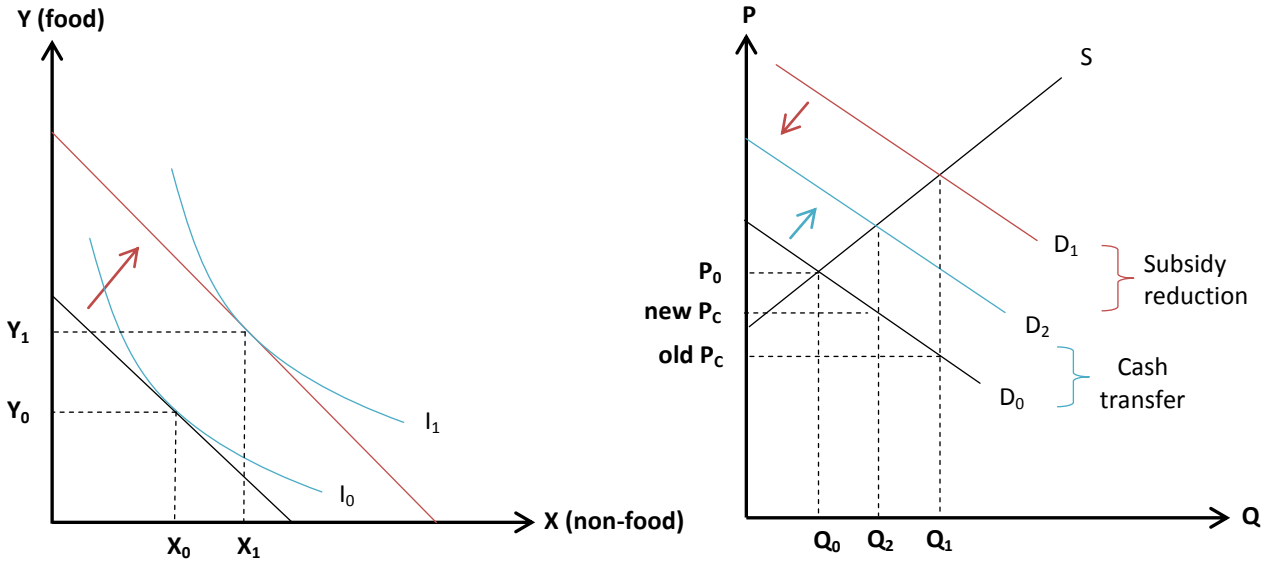
Program cost	IDR 23 trillion (USD 2.3 billion)
Share of total central govt. spending	2.90%
Payment/month	IDR 100,000 (USD 10)
Duration	October 2005 to March 2006 (6 months)
Coverage	15.5 million households (28% of the population)
Increase in household's budget	15.00% of regular expenses

Source: World Bank (2012:2); Widjaja (2009)

Figure 5.1 graphs the short-term effects of such cash transfers. On an individual level, the extra money pushes the budget constraint outwards. That allows the consumer to reach a higher indifference curve than before (from I_0 to I_1), which in turn implies higher utility. Assuming for simplicity that all food and non-food items are normal goods (i.e. goods for which demand increases when income increases), this income effect causes the individual to purchase more goods of both categories. As with any unconditional cash transfers, there is no substitution effect since the relative price of food and non-food items does not alter.

Figure 5.1: Short-Term Effects of Cash Transfers

Individual Level **Aggregate Level**



On an aggregate level (for the consumer), the cash transfer partially offsets the effects of the fuel subsidy reduction. As reviewed with figure 3.1, the fuel subsidies shifted the demand curve up to D_1 and consumers were able to buy more fuel products at a lower price, P_C. If the government increase fuel prices and simultaneously provide a cash grant, two effects will follow. First, the demand curve shifts downwards since the subsidy essentially becomes reduced. However, the cash transfer simultaneously pushes the demand curve upwards. This is because increased consumption at household levels causes the demand to rise. Unless supply is perfectly elastic, prices of normal goods are subsequently expected to increase. This also holds for fuel products although, as noted, the short-term price elasticity of fuel demand is relatively low. In the end, the new demand curve D_2 is located somewhere in between D_0 and D_1, and the consumer end-price (new P_c) reaches a level that reflects the true costs of supply to a greater extent. Ultimately, fuel consumption declines from Q_1 to Q_2.

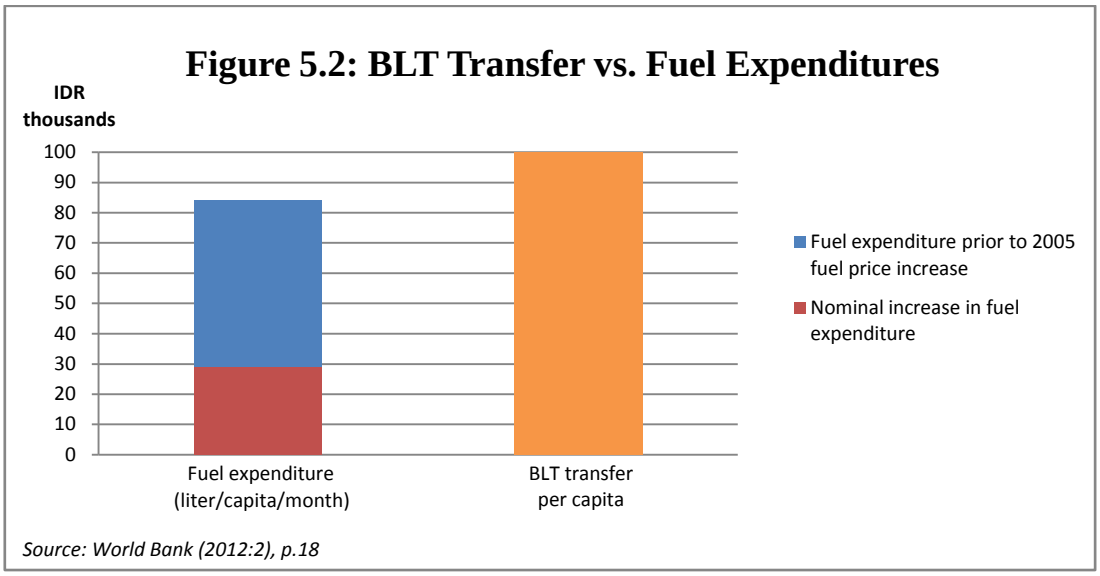


Figure 5.2 shows how the BLT transfer compared to the average fuel expenditure per capita of poor BLT-targeted households. Prior to the 2005 fuel price increases, these households spent roughly IDR 29,000 per month on gasoline and kerosene combined (World Bank 2012:2, p.18)[10]. When subsidies were cut, average fuel expenditure increased by IDR 55,000 per month per capita (World Bank 2012:2, p.18). As can be seen from the figure, this could have been absorbed perfectly fine by the monthly BLT transfer of IDR 100,000 per capita. In other words, the BLT transfer enabled poor households to continue their usual fuel consumption.

However, the BLT households did not consume fuel quantities at the same rate as they had before the price hikes. In fact, six months after the October 2005 fuel price increase, statistics showed that fuel consumption had declined. Specifically, poor BLT households adjusted their fuel purchases downwards in the short run by roughly 4% for gasoline and 40% for kerosene (World Bank 2012:2, p.18). Still, there were other reasons as to why the BLT cash transfer program was described as a success. Mistargeting was reportedly low (94.17% of recipients claimed they received the full amount) and the BLT recipients were generally satisfied with the frequency and quantity of payments (Beaton and Lontoh 2010, p.21). Moreover, by engaging around a third of the population, the government managed to attain high credibility in their efforts to shield low-income households. As a result, major public protests towards the fuel price increases were avoided.

[10] Numbers for diesel consumption are not available, but as reviewed in section 3.4, this is negligible for low-income households.

The cost of the BLT program amounted to roughly IDR 23 trillion and it was funded by the implied budgetary savings from the subsidy reductions (World Bank 2012:2, p.10). The price increases of March and October 2005 caused government subsidy outlays to decrease by approximately IDR 31 trillion, meaning that around two-thirds of the savings went to BLT financing. The remaining third was directed towards other accompanying short-term measures, such as health insurance for the poor and a rural infrastructure project (Beaton and Lontoh 2010, p.20). Still, the BLT program was the most ambitious and comprehensive initiative. Due to its results, the BLT scheme was re-launched before the 2009 presidential campaign following a peak in fuel prices from the year before (Beaton and Lontoh 2010, p.21). In fact, some claim that its popularity was one of the factors leading to Yudhoyono's second term as president (Beaton and Lontoh 2010, p.22).

Similar cash transfer programs have also been successful in limiting public protests from fuel subsidy cutbacks for other countries. In 2010, Iran became the first major oil-exporting country to implement large petroleum subsidy reductions (World Economic Forum 2013, p.6). Before that, the government had struggled with civil unrest when attempting to raise fuel prices. Choosing a different approach, the government decided to compensate its citizens with monthly cash payments. Gasoline prices quadrupled, riot police were deployed, but violence never materialized. Moreover, the price increases removed USD 50-60 billion in fuel subsidies (World Economic Forum 2013, p.6).

Like Indonesia, several other countries have used cash transfers as part of a broader range of measures. For instance, the government of Jordan invested heavily in measures aimed at protecting low- and medium-income households, amongst others by using cash transfers. In February 2008, the country managed to fully liberalize fuel prices (Arze del Granado et al. 2010, p.15). As of recently, India's government has also chosen to pursue targeted cash transfers as a way of helping the poor (World Economic Forum 2013, p.6).

Focus: Using Cash Transfers to Alleviate Poverty?

The BLT scheme was widely regarded as a success. As a measure for alleviating poverty however, the use of unconditional cash transfer programs is more controversial. An argument against is that poverty in developing countries is best reduced by economic growth (Fiszbein and Schady 2009, p.46). In this view, disbursement of cash transfers is seen as having a lower future payoff than investments in areas like infrastructure and education. Adding to this, cash transfers could provide the wrong incentives to its recipients, even if the money is spent sensibly. Notably, getting used to financial backing from the government might discourage the individual's labor supply in the long run (Fiszbein and Schady 2009, p.47).

However, cash transfers could contribute to poverty reduction if they target the poor more effectively than other forms of public expenditure (Fiszbein and Schady 2009, p.47). For the BLT program in Indonesia, this could be determined by households' expenditure patterns for fuels after the cash transfer was given. If poor households had spent most of their cash transfer on formerly subsidized fuels, then the subsidies for these fuels would obviously be well targeted. Put differently, the government would then have successfully identified a good that poor people needed.

Yet, in the aftermath of the BLT program reports indicated that most of the households spent the bulk of their extra cash income on necessities like rice, debt repayment, health and education – in this priority order (World Bank 2010, p.58). In particular, expenditure surveys indicated that gasoline was of low priority after the cash transfer was distributed. In fact, only 5% of the households reported any purchase of gasoline at all (World Bank 2010, p.58). Evidently, the gasoline subsidy was only reaching a few poor households in the first place. According to that logic, cash transfers targeted the poor more effectively than the gasoline subsidies.

The question that remains is whether or not poverty in Indonesia was reduced by the BLT program. Statistics Indonesia reported that, for 2005, 15.97% of the population was living below the national poverty line (Statistics Indonesia). The next year, for 2006, the poverty rate increased to 17.75%. Note that these poverty estimates were derived from a poverty line (IDR/capita/month) that adjusts from year to year, so the percentages are based on threshold levels and not absolute levels. Still, Statistics Indonesia never calculated poverty immediately

after the fuel price increase occurred. Thus, it is difficult to tell how much of this increase that could be attributed to the fuel price increase, and what effect the BLT program had in restraining this increase.

On that note, Widjaja (2009) simulated how the Indonesian poverty levels would change following the fuel price increase and BLT program separately. The results of this simulation are reproduced in table 5.3. First, Widjaja (2009) took the poverty rate of Statistics Indonesia from the year before (in 2004) and calculated a new poverty rate that reflected the fuel price increase to a greater extent. From this it was concluded that, without the targeted cash transfers, the number of people living below the poverty line would have increased from 16.66% to 22.05% during 2005. In other words, poverty was increased by 5.39%, or by 11.5 million people (Widjaja 2009, p.6).

Furthermore, Widjaja (2009) also calculated what effect the "accuracy" of the BLT scheme would have on this new poverty rate. For instance, if 100% of the recipients received the full amount of the cash transfer, the number of people living below the poverty line would constitute 17.87% of the population. If a 50% target was achieved, 20.05% of the population would be defined as poor. In other words, the higher the mistargeting rate of the BLT transfers, the higher the poverty rate level (Widjaja 2009, p.6).

Table 5.3: BLT Effects on Poverty

	Poverty line (IDR/capita/month)	People living below the poverty line
Statistics Indonesia's 2004 poverty rate	110,353	16.66%
Adjusted to fuel price increase[1]	122,909	22.05%
BLT transfer (IDR 100,000/capita/month		
100% target achieved		17.87%
90% target achieved		18.23%
80% target achieved		18.73%
70% target achieved		19.11%
60% target achieved		19.48%
50% target achieved		20.05%

Note 1): gasoline price increase = 87.5%, diesel price increase = 104.8%, kerosene price increase = 185.7%
Source: Widjaja 2009, p.6

By the end of the program (in March 2006), 94.17% of the recipients claimed that they had received 100% of the transfer, while 5.83% stated that they had received less than the promised amount (Widjaja 2009, p.8). According to Widjaja (2009), this implied that the number of people living below the poverty line amounted to around 18.00%. This also matched well with the estimate of Statistics Indonesia, which reported that 17.75% of the population was defined as poor in March 2006.

In sum, the end results of Statistic Indonesia and Widjaja (2009) are largely the same (poverty increased from 16.66% in 2004 to around 18.00% in 2006). However, Widjaja (2009) showed that this increase would have been greater if it was not for the BLT cash transfers (22.05%). Still, despite reduction in poverty caused by the BLT, it could be argued that poverty rates are expected to fall immediately after such cash transfer programs because household's potential for monthly consumption directly increases (Beaton and Lontoh 2010, p.23). Also, some argued that the positive effect on poverty only came as a result of the BLT scheme's definition of eligible households. This view holds that, had the BLT program also included those households that just fell below the eligibility ceiling (i.e. those defined as near-poor), poverty rates would have been higher (World Bank 2010, p.58).

Clearly, there is some confusion regarding the role cash transfers in reducing poverty. In part, this will depend on whether or not the recipients spend the money "right", but it is beyond the scope of this study to elaborate on what that implies. Nevertheless, it should be noted that the Indonesian cash transfer program was never created with a main objective of alleviating poverty. Instead, it was intended to cushion vulnerable low-income households from the impacts of subsidy reform (Beaton and Lontoh 2010, p.23). Still, regardless of the effects on poverty, it is legitimate to question why developing countries like Indonesia continue to utilize subsidies to such an extent when they appear to be less efficient than cash grants in raising the utility of the recipient.

5.3 Other Mitigating Measures

Cash transfers might be successful short-term mitigating measures, but they have little impact in terms of eliminating fuel subsidies alone. In this regard, Victor (2009) highlights other crucial features that any successful subsidy reform needs to include. First, the reform strategy must address contending political interests (Victor 2009, p.26). This can be particularly challenging since the interest groups that defend subsidies are often very well-organized. In Indonesia, information campaigns have frequently been carried out in order to convince the public of the long-run benefits of subsidy removal (Tumiwa et al. 2012, p.39). In Nigeria however, failure to communicate caused violent mass protests in 2012. Specifically, fossil-fuel subsidization ended abruptly overnight and citizens consequently feared that it was a deliberate plot by the Nigerian government to capture the country's resources (World Economic Forum 2013, p.7).

Second, the effectiveness of reform strategies depends on the degree of transparency related to costs and purpose of the subsidies (Victor 2009, p.26). UNEP (2008) also emphasize this, suggesting that information about government subsidy expenditure and its recipients should be made public (2008, p.23). On that note, Indonesia appears to be far ahead of other subsidizing countries given that the government explicitly reports fuel subsidies in the budget accounts. In contrast, many governments worldwide conceal their subsidies as off-budget. Consequently, those who carry the burden are unaware of the costs they are paying (Victor 2009, p.26). Presumably, reforming fossil-fuel subsidies is considerably easier if all members of society know what they are paying for, and the extent to which they or others are benefiting.

Finally, Victor (2009) points out that the design of the subsidy reform is decisive, especially with regards to time consistency. Subsidies might be politically justifiable in the near term, but it is vital to have mechanisms for terminating them in time (Victor 2009, p.27). Again, this is to prevent subsidy recipients of becoming too dependent on their support, which can harm the economy severely in the long run. As seen, a characteristic of the Indonesian subsidy reforms has been to implement price increases in a phased manner (Table 2.2: Successful Reform Attempts). In particular, this gives an advantage in measuring public reactions which ultimately can provide a foundation for discontinuing the policy if turmoil

becomes exaggerated (Victor 2009, p.21). Also, this approach is especially beneficial for low-income households who need time to adapt, but it also involves a risk that the reforms will be reversed later (Mourougane 2010, p.20).

In sum therefore, based on the reviewed cash transfer program and the findings of Victor (2009), a successful subsidy reform should include the following elements:

5.4: Key Ingredients of a Subsidy Reform

What	How (e.g.)	Why
Provide well-targeted social safety nets	Cash transfer program	Shield vulnerable households from the fuel price increase
Address contending political interests	Information campaigns	Convince the public that subsidy removal entails long-term benefits
Transparency in subsidy costs	On-budget subsidy expenditures	Raise awareness of the true costs and (non-)benefits of subsidies
Time consistent reform design	Incremental price increases	Measure public reactions and give low-income households time to adjust

Source: Victor (2009); Beaton and Lontoh (2010); Bacon and Kojima (2006)

5.4 Recent Developments and Future Prospects

As noted, the Government of Indonesia did manage to accomplish a substantial fuel price increase in June 2013 (Table 2.2: Successful Reform Attempts). However, in April the year before a similar attempt was deemed unsuccessful due to large-scale public protests (IEA 2012, p.72). With the presidential election coming up in July 2014, outlooks for immediate subsidy reforms are not ideal. As Braithwaite et al. (2012) points out, the Indonesian government accordingly switches to campaign mode and any potentially unpopular policy decisions will be postponed (2012, p.2). Moreover, subsidy reform might also become a campaign issue for the opposing parties, which in turn could push the government to partially retract its planned reform efforts (Braithwaite et al. 2012, p.3). On a different page, given that a strong government is elected, the subsequent post-election period represents an excellent window of opportunity for implementing new and perhaps more ambitious reform measures (Braithwaite et al. 2012, p.3).

As reviewed, simply increasing the price levels for subsidized fuel has proven to be vulnerable to changes in international oil prices. In the future therefore, Braithwaite et al.

(2012) suggest that other initiatives should be considered. Ideally, achieving market-based fuel prices without government intervention would be the most effective way to eliminate subsidies permanently. This fuel policy would allow the government to adjust fuel prices in line with the fluctuation of oil prices in the world market. Furthermore, this would incentivize oil refiners (Pertamina) to develop higher-grade fuels and consumers would be encouraged to purchase these alternatives (Braithwaite et al. 2012, p.4). Restricting consumption of subsidized gasoline has been suggested as a step towards achieving this. In fact, efforts are underway to forbid sales of gasoline Premium to 4-wheel vehicles in the capital Jakarta, and the plan is to expand this to other areas eventually (Braithwaite et. al 2012, p.5). This would reduce gasoline subsidies and simultaneously increase the demand for higher-quality, non-subsidized gasoline products.

The kerosene-to-LPG conversion program is another prolific strategy that the Indonesian government is likely to continue with. The program was introduced in 2007 in an attempt to reduce the pressing kerosene subsidies by incentivizing households and small businesses to consume LPG instead (Beaton and Lontoh 2010, p.25). Accordingly, the government provided approximately 50 million Indonesian households with the necessary equipment in a so-called "start-up package". The strategy is particularly beneficial for poor households because the cost of LPG is lower than that of kerosene, even when the latter is subsidized (World Bank 2010, p.59). The scheme is also environmentally sound since LPG produces the same amount of cooking energy as kerosene, but at lower levels of pollution.

Table 5.5: Progress of Kerosene-to-LPG Program (in thousand kiloliters)

	2007	2008	2009	2010	2011	2012
Kerosene	9,851.80	8,469.10	4,784.20	2,350.60	1,694.80	1,700.00
LPG	-	506.40	1,774.70	2,693.70	3,256.00	3,606.10

Source: Tumiwa et al. (2012)

Table 5.5 shows the progress of the kerosene-to-LPG program. Since the program was initiated the volume of subsidized kerosene has declined from almost 10 million kiloliters in 2007 to less than 2 million kiloliters in 2012. As a consequence, it is estimated that the Indonesian government has saved over USD 5 billion from the conversion program by

2011 (Tumiwa et al. 2012, p.12). Obviously, there are both environmental and economic gains to be reaped from this scheme, at least in the short term. Beaton and Lontoh (2010) argue that, although LPG undoubtedly is a cleaner energy source than kerosene, the shift still makes Indonesian households dependent on just another subsidized fossil-fuel (2010, p.26). Still, even though the long-term environmental impacts might be uncertain, the strategy has certainly proven to be effective in terms of mitigating budgetary pressure.

6. Conclusion

This paper has reviewed the adverse effects of fossil-fuel subsidies in Indonesia. Here, subsidizing petroleum products have become increasingly unsustainable ever since the country became a net oil importer in 2004. Specifically, subsidies of gasoline, diesel and kerosene have been found to carry large economic, environmental, social and fiscal costs.

As explained, economic inefficiency arises because fossil-fuel subsidies distort price signals so that the true cost of supply is not reflected. Low prices trigger demand, which in turn leads to wasteful consumption of energy. This has led Indonesia to become more dependent on oil imports and the country's trade balance has consequently been affected negatively. Fossil-fuel subsidies have also led to a range of unforeseen economic impacts such as smuggling and illegal fuel substitution. In addition, higher demand for subsidized petroleum products has encouraged environmentally harmful production and it impedes development towards cleaner energy technologies. Air pollution due to traffic congestion has become a severe problem in the major cities of Indonesia. This can be ascribed to the rising middle class and the low fuel prices which has resulted in increased private vehicle ownership.

Moreover, it is evident that fossil-fuel subsidies in Indonesia are socially inequitable. Household expenditure data from 2010 showed that the rich consume considerably more petroleum products than the poor. Because fuel subsidies are provided per liter and do not vary depending on income, high-income households receive the greatest proportion of the subsidies. Thus, the pattern for fuel product expenditures directly determines how the benefits of the fuel subsidies accrue to the population. Specifically, the gasoline subsidy appears to be the least equitable and diesel is only marginally consumed by lower-income households. As such, these fuels do not qualify as "fuels of the poor". Kerosene on the other hand was historically intended to be a fuel for the poor. However, expenditures for this fuel were also shown to rise with income.

Leakages of subsidy benefits to high-income groups happen because the subsidies in Indonesia are distributed universally. This has made fossil-fuel subsidization a fiscally burdensome policy for the government. Evidently, Indonesia's public spending on fuel

subsidies follows global energy movements, which has made the country particularly vulnerable when oil prices are high. Simultaneously, the petroleum product subsidies divert public resources away from more pro-poor spending. As shown, savings from a hypothetical 25% fuel price increase (USD 8.78 billion) would be more than enough to finance two development projects in health and education yet to be introduced. Specifically, full-scale rotavirus immunization would cost USD 64 million annually and save over 5,000 related infant deaths per year. Operating 6,000 Early Childhood Education and Development (ECED) centers for 7 more years would amount to USD 70 million and could have significant impacts for children and the society as a whole.

As described, Indonesia's poor would walk away as winners if fossil-fuel subsidies were permanently phased out in the long term. However, a successful subsidy reform must also address the short-term impacts of de-subsidization. In this regard, the Indonesian BLT cash transfer program was put forward as a success story because it protected vulnerable low-income households from the price increase. In the aftermath of the program, fuel consumption declined and public unrest was avoided. Still, other mitigating measures should accompany such cash transfers. These include information campaigns, transparency in subsidy costs and an incremental approach to price increases.

In the future, Indonesia will continue to pursue market-based fuel prices without government intervention. Restriction of subsidized gasoline consumption and the kerosene-to-LPG conversion program are currently being carried out as steps towards achieving this. Future success will depend on whether the Indonesian government is able to detach petroleum product pricing from the political process.

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